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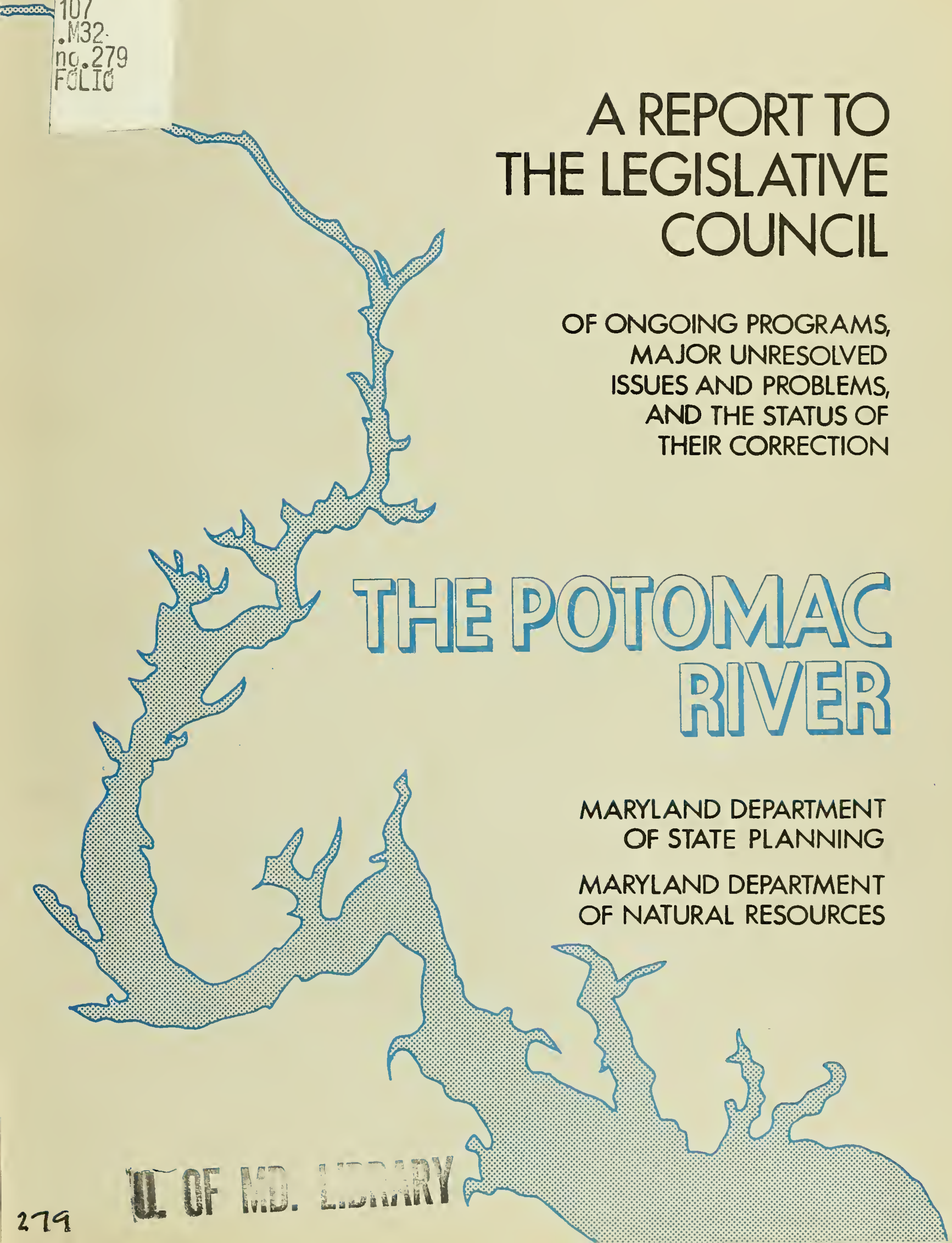
A REPORT TO THE LEGISLATIVE COUNCIL

OF ONGOING PROGRAMS, MAJOR UNRESOLVED ISSUES AND PROBLEMS, AND THE STATUS OF THEIR CORRECTION



THE POTOMAC RIVER

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INTRODUCTION

Water from the Potomac is withdrawn to serve residential, commercial, industrial, and agricultural water demands and returned at many points from the headwaters to the Potomac Estuary. In the future, municipal demands throughout the Basin are projected to increase, particularly in the Washington Metropolitan Area. In addition to the municipal demands, agricultural and industrial demands (excluding power generation) in the Maryland portion of the Basin of 60 mgd in 1980 and 80 mgd in 2010 were projected in the 1965 Maryland Water and Demand Study 1/. Water supply systems have been developed for most of the communities in the Basin; and comparative studies of projected demands to available supply have been conducted in county water plans, in metropolitan area water supply studies, in river basin or regional water resources studies, and in State-level planning studies 2/.

These comparisons have allowed a basinwide identification of water supply problem areas, which are presented in Table A. The first category of problems is where the supply source and/or supply facilities have insufficient capacity to satisfy demands be-

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1/ Tables 3 and 4 (Pages 190-191) of the 1965 Maryland Water Supply and Demand Study. Medium industrial and agricultural projections for the Western Maryland and Washington Metropolitan Regions for 1980 and 2010.

2/ Comparisons of supply and demands were made as elements of the 1963 Potomac River Basin Study, the Board of Engineers (MWCOG) Future Water Supply Study, the North Atlantic Regional Water Resources Study, the Corps of Engineers NEWS Study for the Washington Metropolitan Area, various studies conducted by the water supply utilities, and studies conducted by the Power Plant Siting Program and the Water Resources Administration of the Department of Natural Resources.

fore the year 2000. Most areas in this category have problems only when the flow of the Potomac is less than the projected maximum day demands. The flow of the River fluctuates widely (e.g. the flow of the Potomac River at the Little Falls gauging station near Washington, D.C. varies from a minimum of 601 cfs to a maximum of 484,000 cfs with an average of 10,800 cfs). For the projected 1980 demands the present flow generally will satisf the water requirements 99 percent of the time with a supply defic occurring about 1 percent of the time. Augmentation of low flow or expansion of the dependable yield of the Potomac River and its tributaries by developing more storage capacity would resolve thi category of problems. However, development of other supply sourc (e.g., use of the estuary) and demand management (e.g., peak load pricing) also represent measures that are efficient and environmentally responsible.

The second category of problems is where existing treatment and distribution facilities are inadequate to supply the desired quality or quantity of drinking water. Although leakage is widespread, the most significant problem in this category is inadequate bacterial and chemical quality to assure safe drinking water.

The third category depicts the type of studies needed to identify and evaluate alternative water supply sources.

The major problem area in the basin is the Washington Metropolitan Area. The NEWS Study Report entitled "Critical Choices for Critical Years" projects average daily demands of 520 mgd for 1980, 745 mgd for 2000, and 970 for 2020 for the entire Metro-

TABLE A
IDENTIFIED WATER SUPPLY PROBLEM AREAS

Problem Area	Deficit in Supply Source	Inadequate intake, distribution and treatment facilities	Alternatives needing Adequate consideration
		North Branch Potomac River Area	
1. Upper Georges Cr. Water Service Area	0.4-0.9 mgd in 1985 0.7-1.7 mgd in 2000	Frostburg Reservoir & other facilities need to be upgraded. Bacteriological and/or turbidity problems in small systems must be corrected	Cost analysis of alternatives is needed
2. Cumberland	No deficit	Treatment processes must be upgraded to correct violation to drinking water standards.	Use of Evitts Creek source to serve portions of the Upper George's Creek Water Service Area and for utilizing groundwater near Cumberland.
3. Bloomington	No deficit	Distribution system is corroded and should be upgraded	Regional system with Westernport and Piedmont, WV, utilizing Savage Reservoir and/or Bloomington Reservoir.
4. Kitzmiller	Individual wells are not capable of supplying the projected demand. .09 mgd in 1980 .11-.15 mgd in 2000		A regional supply plan that address all alternative sources, the bacterial quality problems in the Shallmar system, and the demands of the West Virginia communities of Blaine and Elk Gardens.
		Upper Potomac River Area	
1. Hagerstown	Major deficit in Smithburg source.	Bacterial quality and leakage problems in Hagerstown, Smithburg, and Security, which necessitate system improvements and extensions.	Groundwater sources.

TABLE A (cont'd(2)

Problem Area	Deficit in Supply Source	Inadequate intake, distribution and treatment facilities	Alternatives needing Adequate consideration
2. Highfield	0.06-0.09 mgd in 1980 0.11-0.16 mgd in 2000		Re-evaluation of available alternatives which have limited yields.
3. Hancock	0.03 mgd in 2000	Expansion of intake capacity; correction of bacterial problems are needed.	
		Middle Potomac River Area	
1. City of Frederick	1.4 mgd by 2000	Upgrading of system to correct leakage problems is needed.	Evaluation of ground water particularly abandoned quarries.
2. Myersville	0.04-0.12 mgd in 1980 0.14-0.31 mgd in 2000	Metering of water use is needed to minimize leakage in system.	Alternatives to reservoir development on Catoctin Creek.
3. Middletown	0.09-0.25 mgd in 1980 0.27-0.58 mgd in 2000	Metering of water use is needed to minimize leakage in system.	Additional identification and evaluation of alternatives.
4. Brunswick-Rosemont-Knoxville	0.15-0.32 mgd in 1980 0.3-0.5 mgd in 2000	System improvements are needed	Evaluation of identified alternatives.
5. Emmittsburg	0.12-0.23 mgd in 1980 0.23-0.49 mgd in 2000	Improvements to distribution system are needed to assure efficient operation of a combined ground and surface water system.	
6. Thurmont	No deficit. Adequate groundwater supply is available.	Systems improvements to protect instream uses in High Run.	
7. Union Mills Service Area (Westminster, Hampstead, and Manchester)	.06-.1 mgd in 1980 2.28-2.86 mgd in 2000	System improvements and extensions needed for both ground and surface water sources.	(1) Geohydrologic investigation of groundwater; (2) evaluation of using water from Baltimore City's reservoirs; (3) evaluation of a reservoir on Big Pipe Creek.

TABLE A (cont'd(3)

Problem Area	Deficit in Supply Source	Inadequate intake, distribution and treatment facilities	Alternatives needing Adequate consideration
8. Union Bridge	No deficit	System improvements needed to assure a dependable yield and correct bacterial quality problem in the Bowman system.	Evaluation of use of quarries near Union Bridge.
9. Mt. Airy	.042-.09 mgd in 1980 0.336-0.38 mgd in 2000		(1) Evaluation of Gillis Falls Reservoir; (2) connection with the Frederick County system.
10. Taneytown	.03 mgd-0.14 mgd by 2000; no deficit in groundwater supply.		(1) Use of the proposed Sixes Bridge Reservoir; (2) development of an additional well field.
		Potomac River-Washington Metropolitan Area	
1. WSSC Service Area	92 mgd by 2000 in Montgomery and Prince George's Counties	Potomac intake and filtration plant needs to be expanded, and transmission and distribution capacity need to be increased.	Complete evaluation of all viable alternatives with emphasis on demand management, use of the Potomac estuary, more efficient use of available groundwater, and development of a transmission pipeline from the Potomac plant to Tridelphia Reservoir.
2. City of Rockville	3.0 mgd in 1980 4.50-7.4 mgd in 2000	Treatment capacity needs to be increased.	Complete evaluation of all viable alternatives with emphasis on use of the Potomac estuary and demand management.
		Lower Potomac River Area	
1. Waldorf	.181-1.06 mgd in 1980 .077-2.13 mgd in 2000	System expansion needed for efficient service to St. Charles City.	A regional system that interconnects Waldorf with Port Tobacco and La Plata.
2. La Plata	.096 mgd in 1980 0.056-.576 in 2000	None, provided the combined surface/groundwater system presently being installed corrects the existing turbidity problems.	(1) Analysis of reservoir alternatives; (2) evaluation of a regional system.

TABLE A (cont'd(4)

Problem Area	Deficit in Supply Source	Inadequate intake, distribution and treatment facilities	Alternatives needing Adequate consideration
3. Bryan's Road Service Area	0.032 mgd in 1980 0.54-1.87 mgd in 2000	Existing community well systems need increased capacity to correct salt water intrusion, bacterial quality, and excessive turbidity problems.	Service to the Indian Head.
4. Lower Potomac Service Area	.197 mgd in 2000		
5. Other Charles County Areas	Individual wells may be incapable of satisfying 2000 demands in the service areas of Lower Mattawoman Creek, Zekiah-Gilbert Swamp, and Patuxent Service Areas.	System improvements are needed in the Bellewood Estates and Forest Park systems to correct existing bacterial and/or turbidity problems.	
6. Dukeharts Creek Service Area	Individual wells may be incapable of satisfying 2000 demands of this service area.		
7. Piney Point Service Area	Individual wells may be incapable of satisfying 2000 demands of this service area.		

Source: Review Draft of a report entitled, "Water Supply Problem Areas in Maryland" prepared by the Water Resources Administration. The Report constitutes a review of the approved County Water Plans, as of December 31, 1975.

politan Area. Projections for each month, maximum seven day, and maximum day in July, August, September, October, and November also were included in the report. These levels of demand, when compared to the minimum low flow of 338 mgd at the Little Falls gauging station and assuming 100 mgd as the minimum continuous inflow to the estuary, show a potential deficit in August before 1980. However, when storage capacity within the existing distribution systems is considered, deficits in the WMA are not anticipated until after 1990. For the years 2000 and 2020 monthly average deficits for August of 95 mgd and 315 mgd respectively, are projected.

Outside of the Metropolitan Area, significant deficit problems are anticipated in Hagerstown, Highfield, the Upper George's Creek Water Service Area in Allegany County, City of Frederick, Myersville, Middleton, Brunswick-Rosemont-Knoxville, Emmittsburg, the Union Mills Service Area in Carroll County, Waldorf, and the Bryan's Road Service Area in Charles County. Measures recommended to date for correcting these deficit problems include augmentation of the Potomac River above Little Falls, to enlargement of the capacity of existing sources or facilities and/or utilization of other supply sources.

Significant problems due to inadequate supply facilities have been identified in Upper Georges Creek Water Service Area in Allegany County, Hagerstown, Frederick, Hancock, Myersville, Middleton, Union Bridge, Waldorf, Bryan's Road Service Area, and the Bellewood Estates and the Forest Park systems in Charles County. Additional analysis of alternatives is an important concern in the Union Mills Service Area in Carroll County, Waldorf-LaPlata, the Upper Georges Creek Water Service area in Allegany County, and Hagerstown-Highfield.

STATUS OF ON-GOING PROGRAMS

The State of Maryland has recognized that, although its water resources are abundant, their effective management is necessary to assure optimum economic growth and development. Management of our water resources in this manner should prevent water supply from becoming the limiting factor to desired growth and environmentally responsible development in any area of the state.

Background of Maryland's Management Program

The primary responsibility for water supply management historically has been with the local governments or water supply utilities. The state government has played a limited, but ever increasing role in managing water supply. Since April, 1914, the State Department of Health and Mental Hygiene has regulated the construction and operation of water treatment facilities in the State under the authority of Section 394 of Article 43 of the Maryland Code.

In 1933, the General Assembly enacted a regulatory authority on the appropriation and use of water to provide for the maximum utilization of the resource and prevent other uses and water quality from being jeopardized. Rules and regulations have been developed and refined by the Water Resources Administration that protect water quality and instream water uses, and require records of withdrawals by all appropriators to be maintained and submitted periodically to the Administration.

From 1934 through 1960, the regulatory authority on appropriation and use of water and the well drilling permit authority enacted in 1945 was administered by the Department of Geology, Mines, and Water Resources as an information collection program. Since 1970, the program is administered to mitigate conflicts in the use of surface and groundwater resources, many of which became evident during the drought of 1964-1967. As a consequence for the early administrative approach, over-appropriation of streams and improper location of wells occurred; however, these were minimal in number.

Aside from these regulatory authorities, the identification and evaluation of water supply alternatives has remained a local responsibility. Local governments or water supply agencies concentrated their planning efforts on development of sources and facilities to solve immediate problems and to implement routine extension of existing systems. Only the major supply systems (e.g., WSSC in the Potomac Basin) considered their long-range demands and identified and evaluated alternatives to satisfy these demands. Based on these evaluations, facilities were developed and legislation was enacted to assure that the best measures could be implemented when needed.

Water demands of industries, agricultural operations, and recreational facilities not supplied by community systems were not considered in the local planning efforts. Such users independently identified and evaluated alternative measures to satisfy their immediate demands and then implemented the best supply measure from their viewpoint without considering the effects of their use on other users or on water quality.

The conflict among water uses that was of most significance in redirecting the state program was the impact of agricultural irrigation on other water uses as projected in 1960 during the Corps of Engineers Potomac River Basin Study. The irrigation demands also were identified in the Irrigation Survey of 1959. In an attempt to define the rights of farmers to withdraw water for irrigation purposes, the General Assembly enacted a joint resolution in 1961. Testimony by Abel Wolman on this resolution was the primary reason for the 1965 Water Supply and Demand Study. Dr. Wolman believed that such a comprehensive study was necessary to clarify the rights of farmers.

The 1965 Study was conducted by David F. Bramhill and Edwin S. Mills under the direction of the Department of State Planning; and the final report was entitled, "The Maryland Water Supply and Demand Study." The water demands for 1970, 1980, and 2010 for all categories of use and the yields of available and developable water supply sources were compared to determine where and when deficits could be anticipated within the Potomac River Basin. However, this Study did not consider the spatial distribution of water deficits within the Basin. Although this Study made general recommendations for resolving the deficit, it was not specific enough to represent a plan for water supply development nor to define the State's role.

Recent Efforts to Define State's Role

The State government has acted on several occasions to define its role in water supply management. The following acts are significant in this regard:

(1) A 1969 study sponsored by the predecessor to the Water Resources Administration, namely, the Department of Water Resources, determined that the Administration was responsible for encouraging the optimum use and development of Maryland interstate and intra-state waters. Management of those responsibilities requires adequate consideration of the efficient and environmentally responsible provision of water supply to existing and future users. The study indicated that adequate planning at the state level must supplement the regulatory authorities of the state agencies. In addition, the Water Resources Administration should participate in interstate water resources planning and development programs and should fully coordinate federal assistance in all regions of the State to assure that planning, development, and management of our water resources efficiently satisfies projected demands.

(2) The General Assembly in 1969 enacted legislation to require a triennial review of all appropriation permits and to remove the exemption originally granted to municipalities. As a result, the 1934 legislation has been transformed to an effective management tool. In particular, triennial review has allowed the Administration to obtain more complete information on water use and to assure that all permits issued in each sub-basin remain consistent. By this, the Administration is better able to control water appropriations throughout the Potomac River Basin.

(3) Section 387 of Article 43 of the Annotated Code of Maryland enacted in 1966 required each county and the City of

Baltimore to prepare by 1970 comprehensive water and sewerage plans for their jurisdictions. These water supply plans recommended the needed water supply facilities (i.e., sources, transmission, treatment, and distribution facilities) through 1980. These plans represent the county's capital budget for water supply facilities and are subject to an annual review and updating. Review and approval of these plans by State agencies, namely, the Department of Health and Mental Hygiene and the Water Resources Administration, are required.

(4) In 1972, the General Assembly authorized the Maryland Environmental Service (MES) of the Department of Natural Resources to prepare comprehensive five-year regional or river basin water supply facility plans. Formulation of these plans is to be coordinated with other State agencies and with the county water and sewerage plans. The aforementioned authorities expand the State's role in water supply management. Because of this, the State is now able to correct limitations or deficiencies in local or regional plans. Types of limitations or deficiencies are as listed below:

(a) lack of consideration of all available supply alternatives for a service area.

(b) evaluation of alternatives by non-uniform economic criteria and socio-economic information.

(c) consideration of time horizons that are not compatible or that are either too short and too long.

(d) incomplete consideration of the environmental and socio-economic impacts of recommended supply developments or combinations of developments.

(e) minimal consideration of interconnecting water systems within a region where such may be feasible.

Specific Program Activities

To integrate and coordinate the local needs and interests and federal programs for water supply development, Maryland has and is continuing to pursue the following program efforts:

1. Maryland Potomac Water Authority

The Maryland Potomac Water Authority (MPWA) was enacted in 1963 by the Maryland General Assembly to implement the construction of Bloomington Reservoir and to finance the non-federal share of its water supply purpose. To date, the Authority has contracted with the Corps of Engineers for the water supply portion of the Reservoir, has established a repayment scheme based on usage, and is attempting to contract with the District of Columbia for its share of the water supply cost.

Additional water supply developments within the Basin, particularly federally funded projects, could be financed by the MPWA; however, the enabling legislation would have to be amended. Part time staff support for the MPWA is presently provided by WRA; however, full time WRA support will be needed when Bloomington becomes operational and/or when additional supply developments are included under MPWA's legislation.

2. Potomac River Low Flow Allocation Agreement

Until Bloomington Reservoir becomes operative, the available supply during low-flow periods may be less than the maximum demands on the River in the Washington Metropolitan Area. This short-term problem cannot be resolved by on-going planning activities. As a result the water supply utilities, Metropolitan Washington Council of Governments (MWCOG) and WRA have worked cooperatively to develop a water shortage emergency plan and a low-flow allocation agreement. The emergency plan has been prepared by MWCOG and its member counties, while the allocation agreement has been formulated by water supply utilities and WRA. The agreement, which is a prerequisite to Corps of Engineers approval of WSSC's weir, restricts water withdrawals during low flow periods to essential uses and allocates the available flow of the Potomac to each supplier by a formula based on its proportion of total withdrawals during the preceding winter period (December 1 - February 28/29). This procedure has been or will be imposed on all municipal systems as a condition of their WRA surface water appropriation permits.

Although the State's past efforts satisfy the conditions dictated by the Corps, Federal legislation that would, in effect, transfer the appropriation responsibility to an "unbiased moderator" and approve construction of the Weir was considered necessary; and H.R. 12215 and S.3326 have been introduced in Congress. The Corps considers Section 9 of the Act of March 3, 1899 to require such legislation. The State still questions the Corps' position regarding the need for federal legislation, which has the effect of delaying installation of an improved WSSC intake facility.

3. Safe Drinking Water Act

With the enactment in December, 1974, by Congress of the Safe Drinking Water Act, improvements in Maryland's program for regulating drinking water quality became necessary. In addition to establishing minimum drinking water standards, this act requires the State to regulate water use and wastewater disposal to insure that the drinking water standards will be maintained. In particular, this Act imposes more stringent monitoring and treatment requirements for all water supplies in the Potomac River Basin.

4. Evaluation of and Coordination with Federal Water Resources Programs

Because of the interstate nature of the Basin, resolution of the problems in the Washington Metropolitan Area (WMA) have depended heavily on Federal water supply planning efforts. The initial Federal effort was the 1963 Corps of Engineers River Basin plan. Since 1963 the recommendations in that plan have been periodically reviewed and up-dated by the Corps of Engineers. The latest review and revision of the water supply recommendations is the Northeastern U.S. Water Supply (NEWS) Study of the Washington Metropolitan Area. This Study, authorized in PL89-298, was to formulate alternative water supply programs for metropolitan areas in the Northeastern U.S. after considering all available supply measures and the full range of public objectives. In November 1975, an Interim Report for the WMA, entitled, "Critical Choices for Critical Years", was published as part of the NEWS study.

Along with the presentation of alternative water supply programs, the report also identified how the program elements would change in response to different selected sets of objectives and priorities. Recommendations are included for meeting the peak load, or the less than 30 day shortage, problem separately from the plan to resolve the base load problem.

During the NEWS Study for the WMA, investigations of use of the Potomac estuary and coastal plain groundwater were made and the reformulation of Verona and Sixes Bridge Reservoirs was conducted. These evaluations were reviewed by the Department of Natural Resources, and specific recommendations for the resolution of the remaining technical, social, economic, environmental, and institutional "unknowns" regarding each supply measure were made to the Corps. Those "unknowns" that were not adequately addressed are discussed in the "unresolved issues" section of this report. Until the "unknowns" are resolved, a thorough and effective evaluation of the engineering, social, economic, and environmental feasibility of alternative water supply programs cannot be accomplished.

Because the NEWS Study has been superseded by the Washington Area Water Supply Study that was enacted in Section 85 of the 1974 Water Resources Development Act (PL 93-251), recommendations not adequately addressed in the NEWS Study need to be considered in this subsequent study.

UNRESOLVED ISSUES

The specific study efforts that are needed to correct the unresolved issues are presented below. Completion of these efforts should facilitate a more detailed presentation of plans to resolve both the base-load and peak-load problems.

Piedmont Groundwater

An assessment of the hydrogeologic characteristics of the Piedmont limestone areas of the Potomac River Basin is being conducted by the Water Resources Administration. Similar limestone formations in Pennsylvania and Virginia have yielded large amounts of high quality groundwater. There is reason to suspect that these formations could provide large quantities of water in Maryland. If so, construction of a large well field could be as economical to develop and operate and more environmentally desirable than a water supply reservoir. However, the feasibility of this alternative remains only speculative until demonstration wells are developed and pumped, and observations are made to identify groundwater yields, per unit costs, quality and the impact of drawdowns on local water systems and the environment.

To date, aerial photos and remote imagery have been utilized to identify fractures where high yield wells can be located. Pumping information has been assembled for the larger wells in both the Frederick and Hagerstown Valley areas. The location of large wells and springs has been plotted on county maps. An area which meets the technical requirements and which has a water deficit will be selected for detailed field investigation. A preliminary estimate for constructing and testing two demonstration wells is $60,000.

Governmental agencies, or others interested in development of water resources, whether for local industry or downstream low flow augmentation, would then have useful data for determining the economic feasibility of groundwater development, the environmental problems including the possible disruption of local water supply systems, and the impact on Potomac River quality.

If the feasibility study indicates that augmentation is economically feasible and that drawdowns do not significantly disrupt local water systems or cause other environmental problems, the demonstration wells could be converted to production wells.

Emergency Water Supply Plan

Formulation of a peak-load water supply plan for emergency situations in the Washington Metropolitan Area is an essential management need. A peak-load shortage could occur prior to the completion of the Bloomington Reservoir (presently scheduled for November, 1981 with additional delays in completion likely). The "Critical Choices" Report provided the proper perspective by discussing the emergency condition and by stating that major reservoir storage would not solve this problem. Before this latest report, the need for a specific emergency plan had been ignored or assumed to be a purely local responsibility.

The feasibility of a peak-load plan that includes restrictions of non-essential uses on a regular basis needs to be evaluated. A key element of this evaluation is a drought-loss study that would identify the economic and social impacts of shortages of varying lengths on each supplier and/or type of use. Refinement of the drought-loss study conducted during the NEWS Study is needed.

Filtered Water Interconnection

The Black and Veatch Study, which was sponsored by the water supply utilities in the WMA, determined the general feasibility of filtered water interconnection. An evaluation of both feasible interconnections and storage measures, including their staging, is now needed. These measures should be considered when developing the Emergency Water Supply Plan described above.

The Prototype Estuary Water Treatment Plant

Installation of the prototype estuary plant that was authorized in Section 85 of the Water Resources Development Act of 1974 will provide information to resolve the "unknowns" regarding the public health risks of bacteriological and viral infection and the cost of treating Potomac estuary water. The primary public health "unknowns" are: (1) the effectiveness of chlorination in controlling bacterial and viral infection in estuarine water and (2) the primary source of coliform and virus that presently exists in the Potomac Estuary.

The U.S. Environmental Protection Agency has maintained that previous studies on the effectiveness of chlorination in controlling viruses are inconclusive. Nevertheless there is evidence that a 1.5 ppm free residual chlorine concentration in treated water supplies devitalizes all strains of viruses. Also previous tests of estuary water filtered at the Dalecarlia filtration plant and on-going studies at EPA's Taft Center have indicated that chlorination is effective on estuarine water.

A study by Hydroscience, Inc. (for the Maryland Environmental Service -- report, dated April, 1973) indicates that treated wastewater discharges would not cause high levels of coliform at the point of withdrawal near Chain Bridge. Hydroscience recommended further study of the sources and potential effects of the background levels of coliform that have been observed in recent samplings. A similar study of viruses and other pathogens is necessary.

If the free-flowing non-tidal Potomac River is a significant source of pathogens found in the estuary, the public health risks of estuary use may be overstated. Therefore, further study is needed to determine the level to which the estuary can be used without public health problems.

Although the proposed prototype plant will be designed to resolve the question of the effectiveness and economic feasibility of chlorination and advanced treatment processes including their cost in reducing dissolved solids and controlling viruses, this question also needs to be evaluated at existing water and wastewater treatment facilities in the D.C. area. As a control, such an evaluation, if conducted concurrent with the prototype studies, should determine the degree of devitalization attainable from the present level of disinfection and treatment, and identify the additional facilities needed to achieve complete devitalization and solids reduction at the existing plants.

The cost and the yield of both plant-mix and river-mix estuary systems, assuming non-steady state conditions, need to be re-evaluated. Based on the non-steady state condition, the estuary would have a higher yield than that under the steady-state drought conditions of the low flow of record. This additional yield would improve the economic feasibility of estuary use without violating the TDS standard or increasing the risk of public health problems.

Use of the Coastal Plain Aquifers

The Maryland Geological Survey, in cooperation with the USGS, has been studying the water supply potential of the coastal plain aquifers in Southern Maryland for several years. In order to protect users in Southern Maryland, the Department of Natural Resources issued a policy against appropriating any water for export to the Washington Metropolitan Area, until (a) the need for that water is clearly demonstrated and (b) the negative effects of drawdowns are compensated. Further water supply planning efforts must recognize existing and future local water supply demands as constraints on the extent of use by the Washington Metropolitan Area and must consider the negative effects of such use on Southern Maryland users.

A modeling program for all Coastal Plain aquifers is needed. The model would include: (1) a collation of pumpage and water level data on present users for use in model verification, (2) a test drilling program designed to obtain information in areas where present data and simulation models are insufficient, (3) determination of the short-run and long-run impacts of pumping the needed water to Prince Georges and Montgomery Counties and (4) identification of the provisions that will be required to protect or compensate existing groundwater users in Southern Maryland.

This model would also consider the effect on the field estimates of leakage between the aquifers. A recent report by MGS/USGS indicates that leakage could significantly increase groundwater yield, which suggests that the present cost estimate of groundwater production may be high. Furthermore, the cost estimates for installing transmission mains were based on a pipeline through to McMillan water treatment plant. A more realistic approach, which would be considerably less costly, would be an expansion of the existing Anne Arundel County well system to provide emergency backup service to the Washington Suburban Sanitary Commission.

Raw Water Interconnection

This alternative, which has also been termed high flow skimming, should receive additional evaluation. Further evaluation would determine the average amounts and length of time when the Potomac River can be skimmed and the maximum allowable reservoir drawdown to protect other uses.

The cost of water through high flow skimming to the present Patuxent, Occoquan, and Goose Creek reservoirs has been estimated. The construction costs of the pipeline facilities for the Patuxent and Occoquan reservoirs were estimated in the Black and Veatch Study and in the Parsons report. Also, the alternative of developing smaller pumped-storage reservoirs in Montgomery and Loudoun Counties was addressed.

Sixes Bridge Reservoir Project

If reconsideration of the proposed Sixes Bridge Reservoir project by Maryland and the Corps of Engineers leads to a design memorandum as authorized in Section 85 of the 1974 Water Resources Development Act, the following issues should by evaluated (1) measures for mitigating the impacts of reservoir drawdowns on other land uses, (2) the impacts of a reservoir on the assimilative capacity and the aesthetic and archaeological values of the Monocacy River (for example, flow augmentation would reduce the need for high treatment levels at Frederick), and (3) measures to resolve the effects on the probable quality of the reservoir water from present sewage discharges to Toms Creek. In addition to preparing the design memorandum, the Corps of Engineers and the Maryland Department of Natural Resources should assess the economic and environmental feasibility of alternative reservoir sites.

Demand Management

An overall evaluation of the effectiveness of demand management techniques, which should be an element of any water supply program, was conducted during the NEWS Study, but the institutional requirements (e.g., publicity of the problem, fines, and other legal actions) that would be necessary to assure the effectiveness of controlling water demand must still be evaluated.

Wastewater Reuse

The State in planning wastewater treatment facilities in Washington Metropolitan Area particularly the Montgomery AWT Plant has acted to facilitate reuse of treated wastewater either for cooling at the Dickerson power plant or for municipal use within the Metropolitan area. The analysis presented in the NEWS

Study is consistent with Maryland's concept as it assumed the effluent will be discharged at the treatment plant, rather than being discharged to the Potomac Estuary, as EPA has been considering. Discharge to the Estuary would be costly, inconsistent with Maryland's concept of reuse, and would increase the effluent loading in the already stressed estuary.

WATER QUALITY AND WASTEWATER MANAGEMENT

INTRODUCTION

The physical, chemical, and biological quality of the Potomac River and its tributaries varies extensively, as detailed in the recent publication of the Interstate Commission on the Potomac River entitled "Potomac River Basin Water Quality Status and Trend Assessment 1962-1973." The 305(b) Report, a statewide assessment of water quality required by PL 92-500, represents an extension of the above mentioned Commission document and was prepared by the Department of Natural Resources. Present water quality conditions for the Potomac River Basin are summarized below by river area. Tabular information showing water quality conditions by segment is presented in Appendix A. Each segment has been designated by Water Resources Administration Regulation 08. 05.04.09 to be protected for Class 1 "Water Contact Recreation" and either shellfish harvesting (Class II), natural trout (Class III), or recreational trout (Class IV).

North Branch Potomac River Area

This area extends from the head-waters to the confluence with the South Branch near Oldtown. The North Branch mainstem and George's Creek mainstem are Class I waters and Evitts and Wills Creeks are Class IV. All other waters are Class III.

The North Branch of the Potomac River generally has poor water quality throughout the sub-basin. The main sources of degradation are coal mine acid drainage and inadequately treated domestic wastewater.

The reach of the North Branch from the headwaters to Luke usually violates the pH standard, due to coal mine acid drainage in its numerous tributaries in Maryland and West Virginia. Mine drainage contributes acid, alkalies, and mineral salts to the streams, limiting and destroying its suitability for fish and other aquatic life, wildlife, recreation and industrial or municipal purposes. More than 40 miles of the mainstem above Luke, Maryland, and over 100 miles of tributary streams are virtually devoid of aquatic life as a result of mine drainage. In West Virginia, active coal mines are the largest source of acid mine drainage, but drainage from inactive mines appears to be the most significant source from Maryland. Major mine acid contributing tributaries in Maryland include Laurel Run, Lostland Run, Three Forks Run, Elklick Run, Savage River, and Georges Creek.

Abatement of industrial pollution and upgrading of the City of Cumberland wastewater treatment plant have improved the reach of the main river from Luke to the confluence with South Branch. Higher dissolved oxygen and lower bacterial densities are reported. Water quality varies from poor at Luke to fair for the last 10 miles to the confluence with the South Branch, due to the combined effects of residual mine and paper mill wastes. The River receives mine wastes from upstream sources and Georges Creek, treated paper pulp wastes at Luke, treated wastes from several industries along the reach, and domestic wastes from several communities and Cumberland.

The Savage River tributary to the North Branch has excellent water quality with the exception of Aaron Run which is severely degraded by mine drainage. This affects the last downstream mile of the Savage main stem. Many tributaries to Georges Creek are in severe violation of the pH standard, and many places along the mainstem are below the standard due to acid mine drainage. Some tributaries and most of the mainstem do not meet bacterial standards, due to untreated domestic sewage from several towns.

Wills Creek water quality is improving. Bacterial counts are high due to untreated wastes from several towns, but sediment problems from various sand washing operations have been eliminated. Although coal mine wastes degrade the South Branch of Jennings Run, these effects are diluted before reaching Wills Creek.

Upper Potomac River Area

This area extends from the confluence of the North and South Branches to the confluence of the Shenandoah River at Harper's Ferry.

The water quality throughout this sub-basin is generally good. The bacterial standard is met in most of the mainstem Potomac, which is Class I waters. However, the standard is not met in the Potomac for a short distance downstream of Paw Paw and Shepherdstown, West Virginia and below Hancock and Williamsport.

Antietam Creek does not meet the bacteria standard due to feedlot and pastureland runoff, urban runoff, exfiltration from the City of Hagerstown sewerage system at Marsh Run, and failing septic systems.

Conococheague Creek also does not meet the bacteria standard apparently because of septic tank failure, domestic and industrial wastes from Pennsylvania, and agricultural waste. Sediment loads from both of these major tributaries represent serious pollution to the Potomac River.

Middle Potomac River Area

This area includes the drainage area of the main stem and the tributaries from the confluence of the Shenandoah River at Harper's Ferry downstream to and including the confluence of the Monocacy River at the Frederick-Montgomery County line.

The water quality in the Middle Potomac River sub-basin is fair but shows signs of degradation by nutrients and bacteria and sedimentation associated with increasing urban and suburban development.

The main stem of the Potomac (Class I waters) does not meet bacteria standards due to loadings from the population centers of Harper's Ferry, West Virginia and Brunswick, and Point of Rocks, Maryland, as well as urban and agricultural stormwater runoff.

The Monocacy River does not meet bacteria standards primarily due to urban and agricultural stormwater runoff, but occasionally due to inadequate waste treatment. Nutrients are well above that required for algal blooms; and such blooms have occurred throughout the mainstem during extremely low flow conditions. Also, localized algal blooms have also been reported. In addition, the interim treatment levels required of the Frederick City treatment plant cannot protect the dissolved oxygen standard during design low streamflow.

Little Pipe Creek below New Windsor does not meet dissolved oxygen because of inadequate waste treatment. Presently, a facilities planning study is underway for New Windsor. This study should result in an upgrading before 1981.

Catoctin Creek does not meet bacteria standards primarily due to agricultural runoff and failing septic systems and occasionally due to wastewater overflows from Myersville and Middletown.

Nutrients contributed from this River Area may have significant effects on algal growth in the Potomac Estuary. Sediments loads also represent a serious pollution problem.

Washington Metropolitan Potomac River Area

This area includes the mainstem and the tributaries from the Montgomery/Frederick County line downstream to Marshall Hall.

The Potomac River is degraded by organic wastes, bacteria, and sediment loads throughout the Washington Metropolitan Area. The main sources of these are from inadequate treatment and urban and agricultural runoff.

Bacteria densities are less than pre-1966 levels, possibly due to more effective chlorination, but these levels are still sufficiently high that the bacteria standard is not met upstream of Indian Head in the estuary portion of the Potomac.

During 1966 a mean annual average of 67,000 pounds per day of nitrogen and 6,200 pounds per day of phosphorus as P passed over Little Falls from upstream sources and another 10,534 pounds per day of nitrogen and 5,918 pounds per day of phosphorus as P were added by all point sources. This loading resulted in depressed dissolved oxygen conditions and massive blooms of blue-green algae in the upper estuary.

Tributaries such as Seneca, Cabin John, Rock and Piscataway

Creeks and the Anacostia River contribute high nutrient, bacteria and sediment loads to the Potomac. The sources of these loads are stormwater runoff, inadequate waste treatment and/or sewerage system overflows.

Moratoria on new sewerage connections in this sub-basin have been ordered by the State Health Department or local authorities when the capacity of sewerage system, or part of that system, is at or over capacity. Inadequate monitoring of development with respect to system capacities, growing public awareness of concern about the environment and danger to public health have contributed to the number of moratoria. While these actions are necessary to protect public health, if the moratoria are imposed for a long period of time they can have a distorting effect on planned development patterns. People demanding housing are faced with the retricted choices of moving into the cities or moving farther out where individual treatment systems are permitted. By choosing the latter, a more dispersed development pattern is created, with concomitant inefficiencies in providing all services and the potential for future health hazards if individual systems should fail.

Lower Potomac River Area

This area classified as shellfish harvesting water includes the mainstem and tributaries of the Potomac River estuary from Marshall Hall downstream to the mouth.

The water quality throughout this sub-basin is generally good to excellent.

In the main stem from Indian Head to Maryland Point, bacteria populations are decreasing, perhaps due to more effective chlorination at the Blue Plains wastewater treatment plant. Excessive nutrients from sewage treatment plants discharging into embayments and creeks and from upstream contributions cause nuisance algal blooms.

From Maryland Point to the mouth of the River, water quality remains good to excellent. All of the main stem of the Potomac River and most of the tributaries are open to shellfish harvesting. The only tributaries that were closed as of June, 1975, are Upper Breton Bay, Upper St. Mary's River, Upper Wicomico River, Chaptico Bay, Neale Sound, Charlestown Creek, Whites Neck Creek, Partick Creek, Tomakokin Creek, Herring Creek, Schoolhouse Branch, Locust Grove Cove, and Upper Smith Creek. However, most of these areas do not meet the standard for water contact recreation. Recent activities in water quality monitoring/enforcement are correcting point and non-point sources of pollutants in this area.

STATUS OF ONGOING PROGRAMS

Since 1947, when the Water Pollution Control Commission was formed, Maryland has been innovative in its approach to a State water quality program. Elements of Maryland's program are: (1) planning, (2) capital programming, (3) operation and maintenance, and (4) regulation and enforcement. This program is compatible with the existing federal water pollution control legislation and regulations.

Planning

A state law enacted in 1966 requires that each county and the City of Baltimore prepare a comprehensive water and sewerage plan by January 1, 1970 and annually review and update this plan pursuant to established State regulations. State financial assistance is provided for preparing and updating these plans. New regulations which became effective on July 1, 1975, require additional modifications of these plans regarding format, inclusion of data about adequacy of systems, and monitoring information on existing flow. These modifications are due by July 1, 1976. To date, thirteen counties have hired consultants to reformulate the plans in accordance with the new regulations. Review of these plans by the Department of Natural Resources and the Department of State Planning is required. In the past, the county water and sewerage plans have tended to be overly optimistic regarding capital improvement budgets and projected size of needed facilities and have often been inconsistent with State and Regional plans. The forthcoming modifications of these plans should correct these inconsistencies and make the plans more reliable, particularly with respect to the actual capital improvement programs.

The primary purpose of the plans is identification of the magnitude and timing of water supply and wastewater treatment needs and delineation of areas where community sewerage facilities are expected to be provided, on a staged basis. Each county is required to make its service plans consistent with population forecasts and land use and development plans.

In 1970, a state law establishing the Maryland Environmental Service required that 5-year wastewater management plans for regional service areas be prepared. Generally, State efforts to satisfy this law have been deferred in lieu of the 201 facility plans which are required by PL 92-500. The facility plans are written by the local and county governments and are approved by the Maryland Environmental Health Administration and the U.S. Environmental Protection Agency. The 201 Plans must be consistent with 303 (e) Basin plans. After review and comment by Water Resources Administration and Department of State Planning, Step I* grants are processed by the Environmental Health Administration to fund these planning activities. In the Washington Metropolitan Area (WMA), the Washington Suburban Sanitary Commission has the major responsibility for preparing these 201 plans. The Mattawoman plan has been approved and the Dickerson plan has been completed. The town of Poolesville is awaiting Federal approval to begin its facilities plan. The Piscataway, Anacostia, Leonardtown, and Hagerstown plans are being prepared. A sewerage plan for Georges Creek has been prepared that may satisfy EPA Step I requirements.

Section 303 (e) "River Basin Plans" required by PL 92-500 are an interagency effort guided by a continuing planning process for water quality management. These Plans are being prepared by the Water Resources Administration although this function was originially the responsibility of the Maryland Environmental Service. The first Phase of these Plans for the Potomac Basin have been prepared. In preparing the Plans, the Department of State Planning provides population forecasts and socio-economic and land use information. County Water and Sewer Plans provide local policies for system development. The Environmental Health Administration is responsible for summarizing policy where water quality management and public health consideration coincide (e.g., individual disposal systems, shellfish waters).

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*Study of cost effective alternatives for sewerage facilities

Based on that information, the Basin Plans specify wastewater management priorities and needs within each Basin. Existing conditions of statewaters and of existing discharges are also evaluated to establish permissible loadings within each river basin. The Phase I Plans show cost estimates and realistic time tables for abatement. These plans provide valuable input to 201 facility planning and should help insure effective grants administration.

These Phase I River Basin Plans consider non-point sources, but do not evaluate specific control measures. Phase II River Basin Plans will satisfy both Sections 303 (e) and 208 of PL 92-500 and as such will provide for adequate control of non-point sources of pollution. The Phase II Plans are scheduled for completion in September of 1978.

In the WMA, MWCOG has principal responsibility for preparation of the 208 plan and, as a part of that planning effort, establishment of mechanisms for plan implementation. Water Resources Administration has been designated by the Governor as the 208 reviewing agency. As such, the Water Resources Administration will coordinate the MWCOG 208 plan review and certification process with Virginia and the District of Columbia, required in 40CFR 131.20 (f) (2). Water Resources Administration will prevent any duplication of effort in the 208 planning process.

The Potomac River Metropolitan Area Basin Water Quality Management Plan for Metropolitan Washington, Montgomery, and Prince George's Counties has been approved by Governor Marvin Mandel and EPA. The adopted Plan was submitted to the Environmental Protection Agency, Region III on March 1974 as the first of 18 required of Maryland under the Water Pollution Control Act Amendments of 1972.

Prepared in cooperation with Montgomery and Prince George's Counties, the Potomac-Metropolitan Basin Plan identifies major sewerage needs in the WMA, establishes treatment requirements for sewage treatment facilities, and includes a timetable for such major projects as the Dickerson and Piscataway sewage treatment plants.

Additional water quality studies to help assure that treatment requirements in the Plan will continue to be sufficient are also identified. While additional water quality control efforts will be required in the future, the measures outlined in the Plan represent important first steps toward achieving long-term water quality goal For the WMA Blue Plains STP, the State is requesting that the removal of nitrogen be deferred at this time until further studies are completed regarding the benefits relative to the high cost of such treatment. Presently, this proposed deferral of the nitrogen limit is being challenged in an adjudicatory hearing.

Adoption of the Basin Plan was a necessary step in Federal approval of major sewerage projects that Prince George's and Montgomery Counties, in cooperation with the State, have been planning over the past several years.

Some actions have been taken to avoid future moratoria on sewer hookups. In addition to the Federally mandated facilities plans an State River Basin Plans described in this report, the General Assembly enacted amendments to the County Water and Sewerage Planning Ac that prohibit the issuance of building or subdivision permits where adequate capacity will not be available for the proposed development. The EHA is currently developing programs to enforce this law, including requirements to notify the State when a facility is nearing capacity in time to plan for an expansion, if warranted.

Capital Programming

Since 1956, the Department of Health and Mental Hygiene has been responsible for administering EPA, Federal, and State grants for constructing wastewater treatment facilities. In 1974, a priority system for allocating the grants based on the severity of pollution problems and the abatement potential of each project was established by the Department. This system is subject to an annual public review process.

Other federal grants for wastewater treatment facilities, (e.g. FHA, ARC) are coordinated with EPA. State grants are coordinated through the State Clearinghouse, which reviews all applications for federal grant assistance. The county water and sewerage plans, in coordination with River Basin Plans, identify the funds required to finance needed facilities which subsequently are included in the counties' capital programs.

These capital projects provide wastewater treatment to a level which will protect the quality of ground and surface waters. The WRA issues State discharge and Federal NPDES permits for such projects. The WRA effluent limits are, in some instances, more restrictive than the Federal guidelines or minimum Federal standards. The Maryland Environmental Service also has bonding authority to finance and construct regional treatment facilities and to assist local governments in the construction of their own facilities. The State may implement such projects if the local governments agree, or if a local government fails to meet requirements, a State regulatory agency can order implementation action.

Sections 601-606 of Title 7 of the Natural Resources Article creates an abandoned mine drainage control program "to provide for the restoration of State waters affected by pollution from any abandoned mine to the quality necessary to support fish and other aquati life, recreation, and other beneficial purposes".

The Abandoned Mine Drainage Control Act authorizes five million dollars in the bond funds for Secretary of Natural Resources to implement its provisions. The Secretary may acquire and rehabilitate land occupied or degraded by any abandoned deep or strip mine and to take whatever other measures are necessary to prevent, control, and abate water pollution from any abandoned mining area.

Prior to enactment of House Bill 719, land for all public improvements either had to be acquired by the Land Acquisition Division of the Department of General Services (Article 78A, Section 19A(a) of the Annotated Code of Maryland) or the private property owner had to contribute to the cost an amount equal to the increased land value. A Memorandum of Understanding between the Secretary of Natural Resources and the Secretary of General Services regarding implementation of the Abandoned Mine Drainage Control Act is included in Appendix B.

Thusfar, priorities have been determined for spending the funds for studies, design, and construction. In 1971, the Department of Natural Resources retained consultants to conduct an abandoned mine drainage control feasibility survey for the Lower George's Creek and Northwest Allegany County Complex in the Potomac Basin.

As of April 1976, no mines in the Potomac Basin have yet been reclaimed under the Abandoned Mine Drainage Control Act. The major problem in implementing reclamation projects under the Abandoned Mine Act was the acquisition of the necessary property rights. House Bill 719 enacted by the General Assembly in 1976 amended the Abandoned Mine Drainage Control Act to allow a private land owner to defer the reinbursement for public improvements to his or her property until the land use of that property is changed from agriculture or other open space use. Passage of this Bill is expected to greatly expedite the mine reclamation effort.

Operation and Maintenance

The counties are responsible for operating and maintaining their sewerage facilities. The Department of Health and Mental Hygiene (EHA) regulates the operations of these facilities and monitors effluent quality. DNA (WRA) also monitors effluent quality, but additionally regulates effulent quality through discharge permits.

Industrial and municipal water and wastewater plants are classified according to size and complexity; their operators (superintendents) must be certified by a Board of Certification. Education, experience, successful completion of training courses, and test results are considered. Certificates are issued to qualified persons for periods not exceeding three years, the performance of certified superintendents is periodically evaluated, and certificates may be suspended or revoked for cause.

Enforcement/Monitoring

The Environmental Health Administration is responsible for: (a) defining statewide health policy; (b) monitoring and enforcing sewage treatment plant operations; and (c) monitoring specific water quality parameters and enforcing public health standards in shellfish waters. Monitoring and inspection reports are computerized.

The Water Resources Administration: (a) establishes and enforces water quality standards for all ground and surface waters within the State, (b) monitors and assesses the conditions of all State waters, and (c) issues discharge permits for all point source (municipal and industrial). To attain or maintain water quality standards, the Water Resources Administration specifies effluent limits in discharge permits issued to municipal facilities and industrial operations. Compliance with discharge permit conditions is required and enforced. Water quality data are maintained by the Administration on a computerized management information and retrieval system.

Both the National Pollutant Discharge Elimination System and 1972 State Legislation expanded the state's enforcement effort. Water quality standards have been revised, and the point of discharge evaluation program has been expanded into a discharge permit program. Each segment of State waters has been defined as "effluent" or "water quality" limited and a long-term water quality assessment program, part of the 303 (e) planning, is in process. For each stream segment the total loading limits, which are required by present state/federal regulations, have been established. A point source loading limit is defined, which takes into consideration the contribution from non-point sources.

For non-point sources, Maryland's primary effort presently focuses on enforcement of the Statewide Sediment Control Law. This Law, which has been interpreted by the Attorney General to include stormwater management, is an innovative effort to control the problems associated with urbanization. However, this program could be more effective in the Potomac River Basin if the enforcement were expanded, if agricultural land use were subject to the same regulations as other clearing and grading operations, and if stormwater management programs were implemented in each county. The amendment to the Natural Resources Article of the Maryland Annotated Code enacted as House Bill 839 by the 1976 General Assembly gives the WRA additional authorities for conducting the needed watershed studies and implementing management plans.

UNRESOLVED ISSUES

The planning for the Potomac Basin described above will be of little use unless the effluent limitations in the permits, which are a result of the water quality assessment, are enforced. If the permit conditions are met, water quality would be expected to improve to the acceptable levels defined by water quality standards with the uncertain exception of bacterial concentrations, which are primarily a non-point source problem.

One major limitation to meeting permit conditions is the potential lack of available funds from the federal government. Because of the problem, Congress is contemplating postponing the July 1, 1977 deadline for municipal facilities on a case-by-case basis. The State will need to determine what projects will be addressed with the limited funds that may be available.

Whenever material and/or financial resources are in short supply, the State will evaluate certain decisions made by local governments to protect the general public's interests and assure efficient allocation of resources. Such decisions include overdesign or "gold plating" of treatment facilities with process controls, enclosure facilities, related automation and space requirements that are beyond what is needed to satisfy State and EPA standards for effluent discharges.

Overdesign occurs generally in three ways: (1) by projecting high on-line service populations and over estimating wastewater production rates, (2) by choosing an extended, non-optimal design period (i.e., designing for needs too far into the future), and (3) by over-estimating design criteria for individual unit processes. EPA guidelines and documentation in River Basin Plans will minimize the first two abuses. However, EPA and the State have difficulty developing specific design criteria to prevent gold plating of individual unit processes.

For each system, the State's regulatory agencies should ascertain whether the proposed system is the most cost-effective alternative of all reasonable systems available. If not, or if some other process/unit alternatives are more cost-effective, the rationale for selection and the comparative costs should be determined. Any capital items that are not operationally required to satisfy effluent limits or safety requirements should be identified.

The abandoned mine reclamation program has not accomplished its purpose to date. The domestic and acid mine drainage water quality problems, such as those in the Georges Creek area, result in water supply problems. This interrelationship between water quality and water supply must be addressed and resolved.

Non-point sources have not been fully evaluated and presently are not being controlled to the extent necessary. The sediment control program has been successful, however, the agricultural runoff problems (particularly in Frederick, Washington, and Montgomery Counties) must be addressed and controlled in order for sediment control programs to become totally effective.

Another issue which must be resolved is the overlapping of EHA and WRA regarding areas of mutual concern and jurisdiction (e.g. municipal discharge enforcement, grant priorities). These issues and the policy decisions made by each agency must be coordinated so that the State is moving in a single direction toward resolution of the water quality problems in the Potomac Basin.

LAND USE

INTRODUCTION

The Potomac River Basin comprises 14,600 square miles in more than 30 counties of Pennsylvania, West Virginia, Virginia, Maryland and the District of Columbia. Approximately 4,000,000 people live in this region, making a wide variety of demands on the land within the basin. Of this land area, 3,800 square miles are located in Maryland, including the land underlying the Potomac River to the low water shoreline of Virginia and West Virginia.

The area contributing to the upper and middle reaches of the Potomac Basin are predominately in forest and agricultural uses. The Potomac's North Branch Basin includes many active and abandoned surface and deep coal mines. The Washington Metropolitan Area, including Montgomery and Prince Georges's Counties, is highly developed commercially and residentially. Below this area, urban development decreases and rural uses again predominate. Development pressures throughout the basin are resulting in the conversion of farm or forest land to urban and recreational land uses beyond the immediate Washington Metropolitan Area.

Land use and development patterns are inextricably related to water supply, water quality and recreation issues. Development along the Potomac's edge, particularly where land use controls are weak, adversely impacts the river's water quality and aesthetic attributes. Improperly managed and uncontrolled development also increases the flood potential by radically changing the ground cover, thereby altering runoff patterns in the basin. Runoff from urban developments, mineral extraction sites and agricultural operations is another significant contribution to water pollution.

Land Use Planning--State Government

In Maryland, the Department of State Planning is responsible for the preparation of a series of plans for the development of the State. Article 88C of the Maryland Annotated Code specifies the components of these plans, some of which are being integrated into a Generalized State Land Use Plan. When completed, the Land Use Plan will propose a statewide policy framework for future land use decisions by State and local government agencies, as well as the private sector.

Land Use Planning--Local Governments

The authority to prescribe and enforce land use patterns through planning and zoning has been delegated by the States to a variety of county and municipal governments. In theory, land uses compatible with the individual jurisdiction's development policy would result. In practice, the exercise of planning and zoning authority by local governments is significantly varied in its sophistication, if it is exercised at all.

Each of the eight Maryland Counties bordering the Potomac River has established Planning Commissions and retained planning staffs. With the exception of Garrett County, these counties exercise zoning authority throughout their jurisdiction. In Garrett County, zoning is currently limited to the vicinity of Deep Creek Lake. The planning and zoning capabilities of local governments in the other Basin States are more varied, with no local controls being exercised in large portions of West Virginia and Virginia.

Land Use Planning--Regional Agencies

Regional planning agencies serve as forums for the discussion of interjurisdictional issues, carry out certain planning activities and are sources for information and advice. The Interstate Commission on the Potomac River Basin and the Metropolitan Washington Council of Governments provide continuing input with respect to proposed water, land and other resource policies and programs. The Tri-County Councils of Western and Southern Maryland and the Planning District Commissions of Virginia are also concerned with formation of land use related policies. In both States, however, the local governing body has the option of accepting and enforcing the plans suggested by these regional agencies.

The Interstate Commission on the Potomac River Basin is an advisory body with members from Maryland, Virginia, West Virginia, Pennsylvania and the District of Columbia. The Commission conducts studies of the varied aspects of the basin's water resources, assists public and non-public organizations, forms and coordinates plans for water and related land uses in the basin.

The Metropolitan Washington Council of Governments is composed of Prince Georges and Montgomery Counties in Maryland and the Virginia counties of Loudon, Fairfax, Arlington and Prince Williams, the District of Columbia, the City of Alexandria and many other municipalities in Virginia and Maryland. The Council presents a forum for cooperative planning and implementation ventures related to the complete array of regional issues. Some of the Council's most recent activities associated with land use include Water Quality Management Planning under Section 208 of the Federal Water Pollution Control Act of 1972, the Regional Unified Transportation planning program; and the general growth and development activities of the Land Use Policy Committee.

The Maryland National Capital Park and Planning Commission as the principal land use planning agency for Montgomery and Prince George's counties. It is also the manager of a bi-county parks and recreation system.

The Tri-County Council of Southern Maryland is composed of representatives of St. Mary's, Calvert, and Charles County governments and the General Assembly delegation from those counties. The Council assists in the coordination of planning activities and provides technical assistance to the member jurisdictions.

The Tri-County Council of Western Maryland membership includes representatives from Garrett, Allegany, and Washington Counties, the regions larger incorporated places; Hagerstown, Cumberland, and Oakland and rotating representation of several smaller municipalities.

STATUS OF ONGOING PROGRAMS

Areas of Critical State Concern

In response to increasing concern that certain areas with unique physical, biological or locational attributes were being improperly managed and in some instances irretrievably lost, the 1974 General Assembly enacted a law to insure a more intense consideration of these sites through the planning process. The counties and municipalities of the State and the City of Baltimore are required to recommend areas for designation as being of critical State Concern. The Secretary of the Department of State Planning may then designate areas of critical State concern based on the local recommendations. Those counties and municipalities which derive their planning authority from Article 66B of the Annotated Code are also required to include critical areas in their local comprehensive plans. Following designation of critical areas by the Department, the role of local governments is to implement the critical area recommendations where they involve local responsibilities, and to cooperate in the implementation of the critical area recommendations where State and local responsibilities are not involved.

Intervention

In 1974, the Department of State Planning was authorized to intervene in any administrative, judicial or other proceeding concerning land use, development or construction. Procedures have been established with the counties and municipalities to insure that the Department is promptly notified of pending land use decisions of potential State concern. As a result of local government notification or upon the request of a unit of State government, or an individual or private organization, the Department may become a party in interest if the case involves a substantial State or inter-jurisdictional issue.

As a party in interest, the Department will offer its own views and advice, or those of other State agencies. The Department has the right to apply for judicial review and appeal, and it may file a formal statement of environmental or economic impact. However, the Department's role is advisory; it cannot alter the existing powers of other agencies or governmental bodies, nor can it veto or overrule a land use decision.

The program requires the cooperation of local subdivisions, and the Department of State Planning has established procedures by which the local governments notify the Department of upcoming land use proceedings. The intervention process is expected to help the local governmental bodies insure that new development is consistant with local and State land use goals and policies.

Scenic and Wild Rivers Program

The enactment of the Maryland Scenic and Wild Rivers Act in 1968, and its reenactment with major amendments in 1975 has demonstrated the State's commitment to preserve the outstanding scenic, fish, wildlife, and other recreation values possessed by many of its rivers and their adjacent land areas. It is the policy of the State to protect the water quality of these rivers and fulfill vital conservation purposes by wise use of their resources. The intent of this Act is implemented through inclusion of selected rivers in the State scenic and wild rivers system. The Potomac River in Montgomery and Frederick Counties is designated under this act as part of the State Scenic and Wild River System.

It is the responsibility of the Department of Natural Resources to formulate and implement programs to carry out the intent of the Act. The purpose of these programs is to provide for wise management of resources on the land and preservation of their scenic, agricultural, and wild qualities. Programs are to be based on studies and plans prepared by the Department and must be reviewed by a local advisory board for each respective scenic or wild river. Local advisory boards are appointed by the State Scenic and Wild Rivers Review Board composed of the Secretaries of Natural Resources, State Planning, and Agriculture. All programs proposed by the Department must also be reviewed by the Board. As of this writing, a local advisory board for the Potomac has not been appointed.

Upon inclusion into the scenic and wild rivers system, all rivers are given immediate protection from certain types of development. For example, a dam or other structure impounding the natural flow of a scenic or wild river may not be constructed, operated, or maintained and channelization may not be undertaken, without specific approval of the Secretary of Natural Resources. In addition, before specific plans for use and development of water and related land resources are approved, including constructing improvements, diversions, roadways, crossings, channelizations, locks, canals, or other uses which change the charactor of a river or waterway or destroy its scenic value, full consideration and evaluation of the river as a scenic and wild resource must be given.

Responsibility for administering the scenic and wild Rivers Program has been assigned to the Division of Land Planning Services of the Department of Natural Resources.

Coastal Zone Management

The Federal Coastal Zone Management Act of 1972, as amended is an incentive for states to provide balanced management programs to protect the coastal environment and still allow economic growth to serve both the state and the nation. Maryland is currently one of the 30 states preparing a Coastal Zone Management Program (CZMP).

The Department of Natural Resources is the lead agency for CZMP. It is cooperating closely with DSP, DECD, agriculture and other State agencies, local governments and citizen groups in carrying out this program.

This multi-department, multi-interest process is imperative as a means of assuring a balanced approach to resource management.

Preliminary assessment of the State's environmental management authorities have revealed that although existing authorities are not in conflict with Federal requirements, some new legislation may be required, if the State is to qualify for Federal management assistance.

Present emphasis is on a technical advisory role to State and local agencies with legislated authority. In this capacity, CZMP will consider coastal related interests and impacts of wider than local concern. The goals will be to: resolve conflicts among competing coastal uses; promote rational use of coastal resources; protect valuable coastal areas.

Among the many on going study efforts of the Coastal Zone Management Program the following relate to the coastal region of the Potomac River Basin.

The State's Coastal Boundaries CZM staff have developed an approach for defining the inland coastal boundary using biological and physical factors (e.g., wetlands, beaches and tidal drainage basins). These mapped boundary determinants could be selected as the coastal management boundary, although they consist of but one of several possible methods for determining the boundary. At present, they provide CZMP and Local Governments an area of focus for program development.

Offshore Oil and Gas Development By monitoring Federal activities and coordinating with other Mid-Atlantic States, Maryland CZMP is seeking to insure that exploration and developmen of off-shore oil and gas resources is carried out in a way that will minimize negative impacts, and maximize benefits to the State.

The Coastal Facilities Review Act (CFRA), passed by the State legislature last year, provides a double tier, local and State, review and permit process. This Act controls the siting, construction and operation of major facilities such as pipelines, processing plants, storage, harbor development, and fabrication yards. Also under this Act, CZMP will prepare environmental evaluation statements, at the applicant's expense, to assess social and economic impacts on host communities. Regulations for the implementation of the CFRA are being finalized. The Coastal Zone Management Program, in cooperation with the Power Plant Siting Program, is conducting a major study to identify and evaluate suitable major facility locations in Maryland's coastal counties, and is preparing a strategy to respond to proposed major facilities from the standpoints of cost, environmental impact, and socioeconomic and fiscal impacts.

A joint DSP-CZMP study has been completed determining the effectiveness of State and local regulatory and planning powers. Its purpose is to assess a jurisdiction's ability to manage impacts of offshore resources development.

Dredging and Disposal Management CZMP is working in conjunction with the Water Resources Administration on a plan which will evaluate coastal dredging projects and spoil disposal alternatives. The State will use the study results to help improve dredging permitting procedures and assess the cumulative impacts of dredging and disposal activities on the ecological system of the Chesapeake Bay and the Potomac estuary.

Tidal Wetlands: An inventory of Maryland's tidal wetlands is being undertaken. The major task is to map and assess the value of vegetation types. This phase of the study should be completed by December, 1976. At that time, CZMP will begin to assemble data on the productivity and diversity of these vegetation types, and a wetlands information summary will be compiled describing the percent occurrence of each. This information will be furnished on a watershed and county-by-county basis, with a statewide compendium. When completed, the wetlands study will provide more substantial data upon which to base management and regulatory decisions.

Coastal Natural Areas: CZMP is carrying out an improved inventory of coastal plain natural areas. Upland areas of the coastal counties are being studied and catalogued. Using sites suggested by the Department of State Planning's Natural Areas Catalogue, the Smithsonian Study on Natural Areas, and other sources, the entire coastal plain will be inventoried.

Power Plant Siting

Seven major power plants are located in the Potomac Basin. Four of these plants are situated in the Washington Metropolitan area, one is in Western Maryland, one in Southern Maryland and one at Quantico, Virginia.

The Maryland Power Plant Siting Program conducts a continuing research program for evaluation of sites in Maryland for electric power plants. No other basin state has such a program. In Maryland, environmental and land use considerations are included in all studies of potential sites. The Public Service Commission annually prepares a 10 year plan of possible and proposed power plant sites.

Though there has been a slight decline in the rate of increased energy demands, both the Baltimore and Washington Metropolitan Area will require significant expansions of generating capabilities through the year 1995. Several sites along the Potomac are being considered as power plant locations, in addition to expansion of several existing facilities.

The Maryland Outdoor Recreation and Open Space Plan

This plan was developed in a three phase program in conjunction with the Department of Natural Resources. The Concept Plan was completed in 1971 and laid the groundwork for all future open space and recreation planning throughout the State. The Comprehensive Plan recommends State Policy governing open space and recreation, provides Statewide and regional recommendations for areas to be acquired and developed to meet identified needs, defines areas of responsibility; and guidelines to help implement these goals. The Action Plan provides an overall program design for Open Space and Recreation research, and acquisition and development of land. The preparation of this Plan enables Maryland to continue its eligibility in the Department of the Interior's Land and Water Conservation Fund.

The Plan will continue to be implemented using these federal funding sources and the State and Local Program Open Space Funds. This money is collected from a transfer tax on properties and improvements sold within Maryland. Program Open Space is managed by the Capital Programs Administration of the Department of Natural Resources.

PROPOSED PROGRAMS

Potomac National River

Presently in committees of the U.S. Senate and House of Representatives, the Potomac National River bill would establish a 200' strip on the south side and portions of the north side of the Potomac, to be managed by the Secretary of the Interior. Fifty thousand acres of land in Maryland, Virginia, West Virginia and D.C. are included in the proposal; aproximately 30,000 acres are already owned by or are accessible to federal, state, or local governments. The Bill encourages restrictions on the use of the remaining land (through easements) and acquisition in the absence of other forms of land use management. The Secretary of the Interior is to assist the States, counties, and municipalities in the development of land adjacent to the river for recreation, fish, ans wildlife conservation, historic preservation, or similar public purposes. Present national parks, such as the C&O Canal National Historical Park, will remain identifiable units included within the

National River program. Two advisory councils--the Potomac National River Historic Council and the Potomac National River Advisory Commission--will aid federal, state and local governments in administering the program.

The Potomac Heritage Trail

The U.S. Department of the Interior, Bureau of Outdoor Recreation, has proposed the creation of an 814 mile trail along the Potomac for hiking, bicycling and horseback riding. The trail includes battlefields, historic homes, and Washington, D.C., as well as areas of natural beauty. Over 45 percent of the trail is routed on existing federal lands or rights of way. The remainder will be acquired in fee simple, protected under easements, or controlled through agreements with the landowners. The trail will be administered by the National Park Service in consultation with a Potomac Heritage Trail Advisory Council, and State and local governments will be encouraged to participate in its development and maintenance.

UNRESOLVED ISSUES

Uncontrolled Development

Rapid growth and inadequate land use management and controls in many instances has resulted in random, haphazard growth detrimental to the water resources and scenic qualities of the Potomac River Basin. Operation of individual septic tanks in areas where soil and geologic conditions are improper has caused water quality degradation and related health hazards. Construction reduces the ability of the land to slow down runoff and sediment, debris and waste are rapidly carried to the Potomac and its tributaries. The use of impervious surface cover, such as asphalt or concrete, has decreased the infiltration of rain through the soil to the ground water, depressing the water table and heightening the potential for floods.

Encroachment of construction upon the floodplain has increase the probability and severity of flood damage. Use of land within the 100 year non-tidal floodplain will be managed through the Flood Hazard Management Act of 1976, a joint local-State program. In addition a permit is required from DNR for any modifications within the non-tidal 100 year flood plain. Only four of Maryland' 24 major subdivisions have no procedures for restricting occupation of flood-prone lands, however, enforcement by those with procedures varies.

Shoreline Development

Unregulated development along the river's edge is one of the most pressing problems of the Potomac Basin. This problem primarily concerns the south bank of the river, as the C&O Canal Park occupies the majority of the Maryland side. Improper management of development has permitted pollution due to erosion and sedimentation. Aesthetic problems result, as well, when poorly designed south bank areas are viewed from the C&O Canal Trails and the River's surface.

The difficulty in regulating shoreline development arises from interstate complications. Since Maryland owns the Potomac, the State has authority over some aspects of shoreline development through discharge and water withdrawal permits and permits for piers, boat ramps and other constructions in the water. However, Maryland does not get the chance to review as a whole a project to be located in another State. West Virginia's Jellystone Park development is an example of this intergovernmental problem. State and local governments in West Virginia apply little control over development, yet it is probable that the environmental effects of the park will impact Maryland and the river itself.

Another problem of an interstate nature is the effect of shoreline development upon access to the Potomac. Uncontrolled private use of the river banks has reduced the areas available for public access, particularly on the Virginia/West Virginia shoreline from Washington, D.C. to Cumberland, Maryland.

Coal Mining

Deep and strip mining of coal has seriously affected the quality of water in the North Branch of the Potomac. Acidic water draining from abandoned strip mines flows into the Potomac from Garrett and Allegany Counties, Maryland and from areas in West Virginia and Pennsylvania. Both Maryland and West Virginia have laws requiring management and reclamation of active mines--regarding, contouring, and replanting of vegetation. Active mines must also obtain State and Federal waste water discharge permits. Proper reclamation can ensure restablization of land and can prevent acid waste from forming. The major proble is drainage from the older abandoned mines and the potential for future environmental problems resulting from a renewal of deep mining activities.

Maryland deep and surface mine control Acts create funds from a mine reclamation surcharge on each ton of coal mined and other special fees. Maryland has also authorized $5 million in bonds for this purpose. However, reclamation is often a slow and legally complex process, as well as an expensive technical one.

Agricultural Land

With only a few exceptions, the Potomac River Basin outside of the Washington Metropolitan Area is predominately rural. Nearly 900,000 acres in the Maryland portion of the basin are used for agriculture, and most of this land is in the middle Potomac area. Orchards, pastureland and row-crop farming are found in Western Maryland and the Middle Potomac area; estate farming and pastureland in Montgomery County; and corn, tobacco and livestock operations in Southern Maryland.

Development pressures are rapidly changing the agricultural landscape of the Potomac. Conversion of farm land to residential, industrial or highway uses is occurring not only in the Washington Metropolitan area, but around smaller cities and towns, as well. Other agricultural and forest land, particularly in the western portion of the basin, is being developed for private recreational or residential use.

Land still committed to agriculture presents problems of its own. Fertilizer, pesticide and sediment runoff can cause water quality deterioration and runoff from livestock operations can add excessive nutrients and dangerous bacteria to the river. Every Maryland county has adopted sediment control ordinances, pursuant to the Statewide Sediment Control Law, but this law exempts agricultural land. Federal regulations require permits for non-point sources of nutrient runoff from feed lots, but few Maryland operations are large enough to be covered by the regulations.

Forest land, too, is subject to development pressures. 43 percent of the Maryland portion of the basin is forested, but, since 1967, over 3,000 acres have been developed for recreational uses. Except for the West Virginia Pulp and Paper Company at Luke, there are few industrial forestry operations and much of the wooded land is in State and national forests and parks.

Petroleum Facilities

The location of oil related facilities in estuaries creates a high risk of environmental damage. Nursery areas of fish, shellfish beds and wintering grounds of wildfowl may be destroyed by pollution resulting from such operations. Some of these facilities take up much space and demand increased public services. The predicted shortages of oil products have increased the pressure for development of the Outer Continental Shelf (OCS). The tributaries of the Chesapeake Bay, too, are under consideration as to their role in supporting the OCS industry. Currently, the petroleum industry in the Potomac River Basin is limited to storage activities. Steuart Petroleum Company operates an oil storage facility at Piney Point, and has recently proposed doubling of the storage area, and the construction of a refinery and an off-loading pier.

Article 66B, 4.01(c) of the Annotated Code of Maryland prohibits the use of land and buildings in St. Mary's County for refining of petroleum or petroleum products. This law was approved by St. Mary's County voters in a special referendum and was recently upheld by the Maryland Court of Appeals.

Interest in the Atlantic petroleum resources and land based petroleum operations will contribute to continuing interest in the Chesapeake Bay (and the Potomac) for locating staging bases and processing/storage facilities.

INTRODUCTION

Growth in the Potomac River valley has resulted in new problems relating to the use of the Potomac River for recreational purposes particularly along the shore of the River. The increased use of the Potomac River and its shoreline for hunting, fishing, swimming, canoeing, boating, picnicking, hiking, camping and nature study is causing over-use and conflicts between different activities. In addition, changing patterns of shoreline use resulting from the acquisition and development of a national park on the north shore and uncontrolled development on the south shore have changed the opportunities for river related recreation, in some cases threatening the quality of certain recreational experiences.

Except for the Washington Metropolitan Area, the Potomac River flows largely through rural areas. Its immediate shoreline is almost entirely forested floodplain. Above Washington, D.C., the Chesapeake and Ohio Canal* and its associated towpath parallels approximately 185 miles of the river. There are very few major or developed points of public access to the river. There are, however, numerous small and informal points where the public can obtain access to the river.

A draft study by the Department of Natural Resources has foun that bank fishing, small boat fishing, canoeing, high speed power boating and water skiing, and aesthetic viewing are the most popular recreational uses of the Potomac River. For the most part these uses, and other such as hunting and swimming, have occurred at levels well within the carrying capacity of the river and with little user conflict. However, the situation is beginning to change.

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*See page 69 for additional discussion

Slackwater areas are receiving increasingly heavy use by power boaters and water skiiers. Boating congestion and its resulting problems of safety and conflict with other river users now occur on summer weekends. Boating levels often reach two to four times the levels felt to be optimum for such activities.*

Hunting has traditionally occurred on private floodplains and islands and from boats. However, the acquisition of the north shore of the Potomac between Washington and Cumberland by the National Park Service raises new issues with regard to hunting. Many floodplains that were once in private ownership are now under the jurisdiction of the National Park Service which does not permit hunting in Historical Areas and on National Park lands.

As the public recreational use of the Potomac River and the C&O Canal Park continues to increase, the existing system of access points to the river may prove to be inadequate. Many stretches of the river could support greater recreational use without diminishing the quality of the recreational experience. In this case, it may be desirable to enlarge existing points of access or create new access points. Other stretches of the river may become overused. In this case, decreasing opportunities for access may be used to control the overuse of the river.

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*Study of the Recreational Use of the Upper Potomac River, draft by the Maryland Department of Natural Resources, 1973.

The many on-going activities, programs, and studies relating to the recreational use of the Potomac River and the problems and conflicts which result from uncontrolled private shoreline developments are discussed below.

Use of the Potomac River as a recreational resource varies along its length in both magnitude and type. From the headwaters to Cumberland, Maryland, recreational use of the river is diminished because of poor water quality, although hunting and shoreline camping occur. From Cumberland to Washington, D.C. the river provides a variety of recreational opportunities. The major recreational attraction here is the Chesapeake and Ohio Canal National Historic Park, which runs along the Maryland shoreline. Hiking, bicycling, nature study, picknicking, camping, and historic appreciation are possible in the Park. The river itself provides opportunities for canoeing, fishing, hunting, swimming and aesthetic enjoyment. Four slackwater areas in this stretch of river are suitable for boating, water skiing, and swimming. Below Washington, D.C. the river becomes tidal, supporting boating, hunting, fishing, shellfishing, aesthetic appreciation and swimming (where water quality permits).

STATUS OF ON-GOING PROGRAMS

Three major on-going programs dealing with problems of recreation and public access are: (1) The Maryland Study of the Recreational Use of the Upper Potomac River, (2) The Recreational Boating Impact Study -- Chesapeake and Sinepuxent Bays, and (3) the proposal to establish a Potomac National River. Other programs relating to the recreational use of the Potomac River are discussed in sections of this report dealing with the Chesapeake and Ohio Canal Park, Fisheries, Wildlife, Forestry and Recreational Land Acquisition.

The Maryland Study of the Recreational Use of the Upper Potomac River. This study was prepared in response to an agreement made in January, 1972, between the Maryland Department of Natural Resources and the U.S. Department of the Interior, Division of National Capital Parks. A first draft of the study was completed in March, 1974. It has since served as a working document for the Department of Natural Resources and the National Park Service for the Management of the C&O Canal National Historical Park. No completion date for the preparation of a final report has been established.

The study includes sections on (1) generalized recreational demand, (2) recreational activities occurring on the Potomac River, including the location and general level of occurrence, (3) access to the Potomac River in Maryland, Virginia, and West Virginia, (4) conflicts and problems, including special discussions of problems of boating congestion in slackwater areas, and (5) generalized management objectives and recommendations.

The Recreational Boating Impact Study -- Chesapeake and Sinepuxent Bay. This study funded by the Maryland Coastal Zone Management Program, includes the tidal portion of the Potomac River.

Phase I of this study was completed in December, 1974. The results of this portion of the study include an annotated bibliography of recreational boating impacts in relation to a variety of bio-physical factors and a set of 1:62,500 maps identifying the locations of the various bio-physical factors sensitive to boating impacts.

Phase II of the study, completed in early 1976, applies carrying capacity criteria developed in Phase I to specific sub-areas of the state's tidal areas (1) identifies areas of boating under-and over-utilization, (2) evaluates techniques for managing boating impacts, (3) evaluates existing boating regulations, and (4) identifies specific boating facility locations and design and cost criteria.

The Potomac National River Legislation. This bill was introduced in the U.S. Congress in 1974 and again in 1975. The bill would authorize the Federal government, to acquire approximately 20,000 acres of land (preferably in less than fee simple) along the Potomac River from Washington, D.C. to Cumberland, in addition to lands already owned by the National Park Service. Acquisition involves primarily the Virginia-West Virginia Shoreline, where most shoreline land is within private ownership and where uncontrolled development could affect the character of the river, the public use of the river, or the Chesapeake and Ohio Canal Park. The legislation would also require the Secretary of Interior to assist the states and counties along the Potomac to plan, acquire, develop or manage lands along the Potomac for recreation, fish, wildlife conservation or similar public purposes. Within two years of the effective date of the act, the Secretary of Interior would be required to report to Congress his recommendations to extend the National River downstream to the Chesapeake Bay and upstream on the North Branch to the Fairfax Stone.

UNRESOLVED ISSUES

The major unresolved issues relating to recreation and public access are: (1) Recreational boating congestion and new marina siting and development in the Potomac estuary. (2) Public access to the Potomac River through C & O Canal Park lands for boating, hunting and other river uses. (3) Power boat congestion in the slackwaters. (4) Land development, including boat ramps, and public access to the river from the Virginia-West Virginia shoreline on the portion of the river from Washington, D.C. to Cumberland. A related problem is that uncontrolled private use of the river deminishes both quantity and quality of public use. (5) control of land development and provision of public access to the Potomac downstream from Washington, D.C. and upstream from Cumberland.

Public Law 91-664 states that

> "(c) Authority is hereby granted for individuals to cross the park by foot at locations designated by the Secretary for the purpose of gaining access to the Potomac River or to non-Federal lands for hunting purposes: Provided, That while such individuals are within the boundaries of the park firearms shall be unloaded, bows unstrung, and dogs on leash."

At issue are both the location and frequency of these access points and the activities that can take place adjacent to the Park.

CHESAPEAKE AND OHIO NATIONAL HISTORIAL PARK

INTRODUCTION

The C&O Canal National Historical Park was established in 1971 by Public Law 91-664. Since the establishment of the park, most of the land authorized for public acquisition has been purchased by the National Park Service (see "Recreational Land Acquisition"). The park runs for 185 miles along the north shore of the Potomac River from Washington, D.C. to Cumberland, Maryland. A continuous towpath, suitable for walking, bicycling, and horseback riding runs the entire length of the park. In addition, the park provides opportunities for picnicking, camping, nature study, historic interpretation and river access. In 1974, 2,733,000 people visited the park. There were 33,000 hiker-biker camping users and 68,000 total overnight users. The heaviest used area was Great Falls, where 713,000 people visited the Great Falls Tavern.

STATUS OF ON-GOING PROGRAM

The "C&O Canal National Historical Park General Plan and Environmental Assessment" was recently completed. The plan offers a sound conceptual framework for the development of the park. A more detailed development plan will be prepared in the future. The most important aspect of the General Plan is the development of a zoning system which organizes the park into five land use concept zones. The zones are:

Zone A - National Interpretive Areas

This zone defines areas containing major restoration opportunities where the park visitor will be able to see a functioning canal in a historic setting.

Zone B - Historical Cultural Areas

This zone identifies sections of the park where historic resources occur but the high density of Zone A is deemed to be incompatible with the desired mood of the area.

Zone C - Short-Term Recreational Areas

These sections are designed to serve the general towpath user who is desirous of achieving a leisurely stroll of 2 to 6 hours in a natural setting.

Zone D - Short-Term Remote Areas

The objective of these zones is to provide a short-term hiking experience for those who wish to spend an undisturbed day in a natural setting.

Zone E - Long-Term Remote Areas

These sections provide the user with the opportunity for long-term primitive hiking, biking or horseback riding experience.

UNRESOLVED ISSUES

There are certain conceptual aspects relating to the C&O Canal Park that are not addressed in the General Plan. They deal with issues that are the planning responsibility of the State of Maryland. These issues include (1) the need to locate canoe camp sites on the river shore or on inlands, (2) the need for formal recommendations from the State of Maryland concerning recreational boating management, hunting, fishing, river acess, and river safety, and (3) the need to determine methods to control problems on the river resulting from conflicting uses or over-use. In addition, the National Park Service indicated in their General Plan that they would take no actions to modify existing boat or hunter access to the Potomac until formal recommendations from the Department of Natural Resources have been adopted.

Most of the above mentioned issues are discussed further in the section on Recreation and Access as they relate to on-going state "Study of the Recreational Use of the Upper Potomac River."

RECREATION LAND ACQUISITION

INTRODUCTION

There are major recreational land acquisition programs on the Potomac River at both the federal and State (Maryland) level. The major federal acquisition program is the Chesapeake and Ohio Canal National Historical Park. State acquisition programs concentrate on the completion of land acquisition within the established take lines for existing state parks New areas, however, are being acquired along the lower portion of the Monocacy River, and the acquisition of islands in the Potomac River is currently under study.

STATUS OF ON-GOING PROGRAMS

Federal

At the end of 1974, the land acquisition program for the Chesapeake and Ohio Canal National Historic Park was over 85% complete. Almost 10,000 acres have been acquired since the park was authorized in 1971. Another 3,400 acres are in either state or county ownership. Approximately 5,200 acres were federally owned before the acquisition program was begun. This represents a total public ownership of over 18,000 acres.

State

The State of Maryland owns property at nine locations on the Potomac River. A list of these areas and the status of land acquisition at these areas is listed below:

January 1, 1976

AREA	TOTAL PROGRAM	ACQUIRED	UNDER NEGOTIATION
Potomac State Forest	12,591 acres	12,098 acres	0 acres
Green Ridge State Forest	51,477	27,547	3,544
Sideling Hill WMA	2,136	2,136	100
Fort Frederick	590	415	145
McKee Beshers WMA	1,960	1,698	*
Seneca State Park	6,609	3,628	844
Diersen WMA	40	40	0
Purse State Park	148	148	0
Point Lookout State Park	705	514	0

*All property along the Potomac

There are also two new state projects on the Potomac River relating to the acquisition of privately owned islands and the acquisition of property along the lower Monocacy River.

Project Status of the Proposed Potomac River Island Acquisition Program: The desirability of State acquisition and management of Potomac River privately owned islands, has led the Land Planning Services Division to prepare an acquisition proposal, at the request of concerned Department of Natural Resources agencies. Pertinent material is being compiled and recommendations prepared for the attention of the Secretary.

The principal objectives of this proposal are: (1) to preserve the natural characteristics of the islands, retaining their important scenic and aesthetic quality; (2) to conserve and manage valuable biological habitat for water fowl, fur-bearers, wading birds, fish, and other wildlife; (3) to provide sanctuaries and managed areas for unique or unusual flora and fauna found on these limited types of habitat: (4) to establish limited recreational uses compatible with preservation and conservation objectives; (5) to allow for adequate planning to minimize adverse effects to exceptionally important archeological resources; and (6) to develop a compatible program with on-going projects of Federal, State and local governmental agencies concerned with preserving the environmental quality of the Potomac River Basin.

Research on size, ownership, and location of islands has been completed and biological data on both flora and fauna are now being prepared. Other information, such as access points, recreational uses and demands, general management plans, and cultural information is also being documented.

Recommendations for the proposed acquisition of privately owned islands located in the Potomac River are expected to be completed by December, 1976.

Project Status of Acquisition and Development for the Monocacy Natural Resources Management Area

This project proposes to acquire 2,000 acres located adjacent to the Monocacy River from the foothills of Sugarloaf Mountain to the Monocacy's confluence with the Potomac River. As of April 1, 1976, 1475 acres have been acquired. The completed acquisition project will provide a corridor of ownership on both sides of the Monocacy River connecting the Stronghold Sugarloaf property to U.S. Park Service lands along the Potomac and Monocacy Rivers. Stronghold, a 3,000 acre registered natural landmark, is dedicated to educational uses and to public enjoyment of the natural beauty of Sugarloaf Mountain.

Long range plans for this area are not expected to be completed for five years. An interim management and development program is underway. Studies and research will be undertaken during this interim period to provide information for preparation of long range plans.

During the interim period emphasis will be placed on preservation of historic, scenic, unique and biological features, wildlife, fishery and forest management, and soil and water conservation.

Managed recreation stressing low density outdoor and open space uses will be provided in the interim period. The major recreation activities will be hiking, naturewalks, fishing, hunting, boating, educational and scientific interpretive programs.

UNRESOLVED ISSUES

The major unresolved issue is whether or not to acquire the privately owned islands in the Potomac River.

Other issues relate to the specific negotiations of individual parcels of land within established takelines. The Department of Natural Resources, Division of Land Acquisition, Program Open Space, resolves these problems as part of its administrative responsibilities.

STATUS OF STATE PARKS ON THE POTOMAC

INTRODUCTION

The State of Maryland administers five state parks along the shoreline of the Potomac River. Three of these parks, Point Lookout, St. Clements Island, and Purse are along the tidal portion of the Potomac. Seneca and Fort Frederick Parks are located upstream from Washington in Frederick and Washington Counties respectively. These parks offer various recreational opportunities, including swimming, camping, picnicking, fishing, boat launching and nature study.

STATUS OF ON-GOING PROGRAMS

The status of the planning and development of each of the parks along the Potomac River is described below.

Point Lookout State Park

Planning and development have been in progress at Point Lookout State Park since 1965, when the first Capital Improvements Appropriation was made available for development of park facilities.

The development has continued generally in accordance with the Master Development Plan originally prepared by the Department of Forests and Parks planning staff. The plan has received periodic revisions to meet changing conditions and is currently scheduled for review and updating in 1976.

Major facilities completed are: (a) Day-use beach, bathhouse and parking facilities, (b) Camping area roads, campsites, shower buildings and registration building, (c) Park office and information center, (d) Water supply and distribution system, (e) Waste water treatment and collection system, (f) Shore erosion control (Chesapeake Bay side).

Major facilities currently funded and under design or construction are: (a) Boat launching and boat rental facilities, (b) Group camping facilities, (c) Nature center and pedestrian bridge to natural area, (d) Maintenance service center, (e) Family picknicking facilities, (f) Capping of stone jetty for fishing.

St. Clements Island Wildlife Sanctuary

The Island is maintained as a sanctuary and historic site. The trails, the historic monument, a picnic area and boating piers are maintained for public use. There is no plan for further development of the island.

However, consideration has been given to developing a mainland interpretive center with a parking area and a pier for loading and unloading visitors from a State operated ferry boat.

A small parking area has been constructed on a one acre tract of land adjacent to a large existing pier located a Colton Point. The area has not been placed in operation and the project has been inactive since 1968.

Purse State Park

Purse State Park is undeveloped. Planning has not been initiated.

Seneca State Park

Design and construction are in progress for the development of the Clopper's Area of the Park. The proposed ninety acre recreation and flood control lake is currently under construction, while the design for the picnicking facilities, boating facilities, trails, office and vistor's center, maintenance service center and utilities are in the final stages of preparation.

The development of the Cloppers Area is the first priority in the implementation of the Concept Plan adopted by the Department of Natural Resources and approved by the Seneca State Park Advisory Committee in 1973.

The Concept Plan calls for historical emphasis in the area between River Road and the C & O Canal, to be Coordinated with the plans of the National Park Service. Master planning for the lower portion of the Park, including this area, will begin in early 1976.

The Department currently has funds available for construction of a boat ramp at Seneca to provide access to the Potomac River. This project will be considered during the master planning for the area. In the interim period, the existing boat ramp on National Park Service land will continue to be available.

Fort Frederick State Park

Construction is in progress for the restoration of two enlisted men's barracks located inside the Fort; and design has begun for the access road, parking area and visitor's center which are part of a development program for the Bicentennial Celebration.

This development is in accordance with a Concept Plan for the development of Fort Frederick State Park. Additional planning such as site inventory and analysis, archaeological studies and the preparation of a park master development plan will be accomplished before further development occurs.

UNRESOLVED ISSUES

Several issues remain to be resolved in relation to the planning and development of state parks along the Potomac River.

At Point Lookout, there is a need to determine (1) the urgency of shore erosion protection along the river, (2) the demand for continued development of day-use and camping facilities in the immediate future and (3) the need for acquisition and/or land use control of lands adjoining the park and access road. Directly related to this is the need to resolve the proposal by St. Mary's County to expand and use the park waste water treatment plant to serve as the regional plant for the Lake Conoy Sanitary District in St. Mary's County. These issues are currently being studied by the Department of Natural Resources.

Planning of mainland facilities at St. Clements Island should be completed.

Master planning for the development and use of Purse State Park should be initiated.

INTERSTATE COORDINATION

INTRODUCTION/ONGOING ACTIVITIES

Early recognition of the need for coordination among the five jurisdictions in the Potomac River Basin led to the formation of the Interstate Commission on the Potomac River Basin in 1940. The ICPRB is an advisory board with members from Maryland, Virginia, West Virginia, Pennsylvania and the District of Columbia. Originally, the Commission's job was one of fact finding, public information, and promoting cooperative efforts among the States of the Basin. In 1970 following the approval of member states and the Federal government, the Commissions' role was expanded to include: forming and coordinating plans for pollution control, the conservation and development of water and land resources, and assisting public and nonpublic organizations. The commission currently conducts studies of many aspects of the water resources of the basin, maintains a collection of all publications relating to the Potomac and offers advice and recommendations to the member jurisdictions. These recommendations are not binding upon the member states, however, and the Commission serves primarily as a source of information and ideas.

A second interstate body the Potomac River Fisheries Commission composed of three members from Maryland and three from Virginia. The Commission's authority is limited to regulation and licensing of fishing activities and its regulations are enforced by a joint effort of the law enforcement agencies of each state.

It has become apparent that, although many state and federal agencies have an interest in or responsibility for one or more aspects of the Potomac River Basin, none has the legal authority to provide the broad, continuous guidance for development and management on a regional basis. A Potomac River Advisory Committee was formed to draft an interstate-federal compact calling for the creation of a basin agency responsibile for the conservation, utilization, development, and management of the water and related resources of the Potomac River Basin. The Potomac River Basin Commission created by this compact would adopt and promote coordinated policies for water resources conservation, use and mangement, and would adopt a comprehensive water resources plan. The Commission would also adopt rules, regulations and standards necessary to implement its policies.

As originally proposed, the Compact required the participation of the five basin states and the federal government. Pennsylvania and West Virginia have not approved the compact because they feel it offers little benefit to these upstream states. A modified compact, composed of Maryland, Virginia, D.C., and the federal government, has also been abandoned. This "minicompact"-- was similar to the original compact, but its powers would not have extended to activities in West Virginia and Pennsylvania, unless they choose to join at a later date.

The mimi-compact's commission would have regulated and controled all water resources activities having interstate impact within the member jurisdictions. Activities such as water withdrawals, effluent, discharges, impoundments and construction in the floodplain would have veen regulated by the Commission. Non-voting observers from Pennsylvania and West Virginia could have participated in the Commission's deliberations to the extent that their interests are involved.

Currently, no formal intergovernmental body regulates recreational use of the Potomac. The Maryland Department of Natural Resources works closely with the National Park Service, the Army Corps of Engineers, the States of Virginia and West Virginia, the District of Columbia, the Maryland Counties and Municipalities and Wash COG*. A "Study of the Recreational Use of the Upper Potomac River" has been drafted by DNR, with the aid of the National Park Service. The successful implementation of this study depends upon the ability of the State of Maryland to cooperate and gain the support of the various federal, state and local government bodies. The Departments of Natural Resources and State Planning have served as active members of the C&O Canal Citizens Historic Park Commission.

The Potomac National River, if approved by Congress, will require intensified coordination and planning among the basin states, local governments, and the U.S. Department of Interior. An emphasis on private ownership of the river shoreline, increased access to the river, and managed use of the surface waters, serve as examples as to why that coordination must take place.

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*Washington Metropolitan Council of Governments.

The construction of multi-purpose water impoundments by the Corps of Engineers has long been a subject of mixed and heated opinion. The interstate implications of water quality and supply, flood control, and recreation in addition to the significant problems associated with the location and construction of a reservoir underscore the inevitable necessity of additional interstate discussion and compromise.

UNRESOLVED ISSUES

The foremost interstate issue yet to be resolved is the creation of an interstate institution for coordinating decisions on water and related resources. The Potomac River Basin Compact; and the Mini-Compact, are but two of the alternatives that are being considered. Other possibilities exist: including the formation of federal-regional agencies, such as the Tennessee Valley Authority, which exercise total control over the water resources of the basin; river basin interagency commissions, which primarily coordinate; and regional Councils of Governments, which are generally advisory and coordinative. This is superficially an institutional issue. However, if no new body is created, the material issues which are the crux and the driving force for institutional change will still exist. These issues run the gamat of water quality and supply, recreation, fisheries, wildlife and forestry, the siting of major public facilities all as manifested through various land uses. The discussion of issues related to these topics have been covered in various sections of this report.

UPPER POTOMAC RIVER AREA SUB-BASIN

SUMMARY OF WATER QUALITY

SEGMENT	NO.	MEETS WATER QUALITY STANDARDS				COMMENTS[2]
		D.O.	Temp.	pH	Bacteria[1]	
Potomac River Mainstem	(01)	yes	yes	yes	*	*Bacterial values were high and did not meet standard below STP's serving Paw Paw, West Virginia and Han MD, and below the mouth of Antietam Creek. Standa were met above Cacapon River and above Conococheag Creek.
Antietam Creek	(02)	yes	yes	yes	no	Bacterial values greatly in excess of the standard throughout the entire course of Antietam Creek. STP's, agricultural and urban runoff, and industri are responsible for high densities.
Conococheague Creek	(03)	yes	yes	yes	no	Generally bacterial values did not meet the standar throughout the stream. Causes of high bacterial values were domestic and industrial wastes which e the stream from PA. In MD pollution is by septic tank failure, agriculture, and tannery wastes. Nutrient concentrations were high at stream mouth.
Little Conococheague Creek	(04)	yes	yes	yes	*	*Bacterial values did not meet standards at the mouth Little Conococheague and in Toms Run below the Cle Springs STP.
Licking Creek	(05)	yes	yes	yes	*	*Bacterial values did not meet standards at the mouth of Licking Creek. Agricultural runoff believed to degrade stream.
Tonoloway Creek	(06)	yes	yes	yes	*	*Bacterial values did not meet standards at the mouth Tonoloway Creek. The Hancock STP effluent believe to be the cause of high bacterial values at the mo
Sideling Hill Creek	(07)	yes	yes	yes	yes	
Fifteen Mile Creek	(08)	yes	yes	yes	*	*Bacterial values did not meet standards 3.0 miles ab the stream's mouth. There are no known pollutants entering the stream.
Town Creek	(09)	yes	yes	yes	*	Water quality of lower part of Town Creek was good. *Bacterial standards were not meet in upper sectio of creek and in Murley Branch. Failing septic tan and agricultural runoff degrade water quality.

UPPER POTOMAC RIVER AREA SUB-BASIN
(con't.)

SUMMARY OF WATER QUALITY

SEGMENT	NO.	MEETS WATER QUALITY STANDARDS				COMMENTS[2]
		D.O.	Temp.	pH	Bacteria[1]	
Dargen	(10)	–	–	–	yes	There are no known problems in this segment.
Downsville	(11)	–	–	–	–	There are no known problems in this segment.
Pinesburg Station	(12)	–	–	–	–	There are no known problems in this segment.
Green Spring	(13)	–	–	–	–	There are no known problems in this segment.
Timber Ridge	(14)	–	–	–	–	There are no known problems in this segment.
Tonoloway Ridge	(15)	yes	yes	yes	*	*Bacterial values did not meet standards near the of Little Tonoloway Creek. Source(s) of polluti are unknown.
Indigo Tunnel	(16)	–	–	–	–	There are no known problems in this segment.
Sorrell Ridge	(17)	–	–	–	–	There are no known problems in this segment.
Other	(18)	–	–	–	–	There are no known problems in this segment.
West Virginia	(20)	–	–	–	–	There are no known problems in this segment.

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[1] See Chapter I--Bacteria, (305(b) Report)

[2] These are brief notations indicating significant water quality considerations. See the appropriate sub-basi Chapters for detailed descriptions. (305(b) Report)

*Notation where neither "yes" or "no" adequately describes segment water quality. See comments or sub-basin Chapters for additional detail.

NONPOINT SOURCES IN THE UPPER POTOMAC RIVER AREA

BASIN NEEDING EVALUATION (Basin Segment Code)	DRAINAGE AREA (SQ. Miles)	PRINCIPAL TYPE OF NONPOINT SOURCE PROBLEM
02-14-05-01	592.0	urban and agricultural runoff, soil erosion
02-14-05-02	187.0	urban and agricultural runoff, soil erosion
02-14-05-03	65.8	agricultural and urban runoff
02-14-05-04	16.7	agricultural runoff
02-14-05-05	27.6	agricultural runoff
02-14-05-06	2.1	agricultural runoff
02-14-05-07	23.1	no known source
02-14-05-08	49.2	agricultural runoff
02-14-05-09	66.9	septic tank failure, urban and agricultural
02-14-05-10	11.1	no known source

NONPOINT SOURCES IN THE UPPER POTOMAC RIVER AREA.

BASIN NEEDING EVALUATION (Basin Segment Code)	DRAINAGE AREA (SQ. Miles)	PRINCIPAL TYPE OF NONPOINT SOURCE PROBLEM
02-14-05-11	54.2	urban and agricultural runoff
02-14-05-12	6.3	no problem
02-14-05-13	20.5	no problem
02-14-05-14	11.0	no problem
02-14-05-15	20.8	urban runoff
02-14-05-16	0.9	no problem
02-14-05-17	26.8	no problem
02-14-05-18	2.0	no problem

NORTH BRANCH POTOMAC SUB-BASIN

SUMMARY OF WATER QUALITY

SEGMENT	NO.	MEETS WATER QUALITY STANDARDS D.O.	Temp.	pH	Bacteria[1]	COMMENTS[2]
Lower North Branch	(01)	no	no	yes	no	D.O., Temp. and Bacterial values in excess of standa from Luke to Cumberland. Below Cumberland to the mouth only bacterial values are in excess of stan values.
Wills Creek	(02)	yes	yes	*	no	Bacterial values in excess of standards. Ph below standard from coal mine wastes.
Georges Creek	(03)	yes	yes	no	no	Bacterial values in excess of standards--inadequate domestic waste treatment. Ph below standard from coal mine wastes.
Savage River	(04)	yes	yes	*	yes	Ph in Aaron Run below standard from mine wastes, at times of low water Aaron Run degrades the mouth of the Savage.
Upper North Branch	(05)	yes	yes	no	yes	Ph below standard due to coal mine wastes.
Tributaries, lower North Branch	(06)	yes	yes	yes	*	Bacterial values exceed standard values in Ebitts Cre
Tributaries, upper North Branch	(07)	yes	yes	*	yes	Ph in many streams below standards due to mine wastes
Dans Mountain	(08)	yes	yes	yes	yes	Little data available.
Luke Area	(09)	yes	yes	no	yes	Ph below standard in seepage from several mines.
West Virginia Area	(15)	-	-	-	-	No WRA data, state of West Virginia.

[1] See Chapter I--Bacteria. (305(b) Report)

[2] These are brief notations indicating significant water quality considerations. See the appropriate sub-basin Chapters for detailed descriptions. (305(b) Report)

*Notation where neither "yes" or "no" adequately describes segment water quality. See comments or sub-basin Chapters for additional details.

NONPOINT SOURCES IN THE NORTH BRANCH POTOMAC RIVER

BASIN NEEDING EVALUATION (Basin Segment Code)	DRAINAGE AREA (SQ. Miles)	PRINCIPAL TYPE OF NONPOINT SOURCE PROBLEM
02-14-10-01	501.3 (md.) 1,328.3 (Total)	mine waste, urban runoff
02-14-10-02	~~253.6 (Total)~~ 60.4 (Md.)	mine waste, agricultural, urban runoff, ~~septic tank failure~~
02-14-10-03	73.4	mine waste, urban runoff, septic system failure
02-14-10-04	116.4	mine waste - Aaron Run
02-14-10-05	104.8 (Md.) 287 (Total)	mine waste
02-14-10-06	89.9 (Md.)	agricultural; small amount of urban
02-14-10-07	104.8	mine waste
02-14-10-08	55.9	unknown
02-14-10-09	1.2	mine waste

MIDDLE POTOMAC RIVER AREA SUB-BASIN

SUMMARY OF WATER QUALITY

SEGMENT	NO.	MEETS WATER QUALITY STANDARDS				COMMENTS[2]
		D.O.	Temp.	pH	Bacteria[1]	
Virginia Area	(10)	-	-	-	-	Water quality data not available.

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[1] See Chapter I--Bacteria. (305(b) Report)

[2] These are brief notations indicating significant water quality considerations. See the appropriate sub-basin Chapters for detailed descriptions. (305(b) Report)

*Notation where neither "yes" or "no" adequately describes segment water quality. See comments or sub-basin Chapters for additional details.

MIDDLE POTOMAC RIVER AREA SUB-BASIN

SUMMARY OF WATER QUALITY

SEGMENT	NO.	MEETS WATER QUALITY STANDARDS				COMMENTS[2]
		D.O.	Temp.	pH	Bacteria[1]	
Mainstream	(01)	yes	yes	yes	no	Fecal coliform values exceed standards throughout m stream mainly because of STP effluents, and agri tural and urban runoff.
Monocacy River	(02)	yes	yes	yes	*	*River generally does not meet bacterial standards b cause of STP effluents, and agricultural and urb runoff. Frederick City STP contributes nutrients to the lower river. Little Pike Creek below New Windsor did not meet the D.O. standard in 1974 because of municipal STP discharge.
Catoctin Creek	(03)	yes	yes	yes	*	Bacterial standards were not met in Catoctin Creek Myersville to the mouth of the creek, and in Litt Catoctin Creek--West, Little Catoctin Creek--East Hollow Road Creek, Cone Branch, and Broad Run. Causes of high bacterial values were the Myersvil and Middletown STP discharges, and agricultural a urban runoff.
Point of Rocks	(04)	yes	yes	yes	*	Fecal Coliform values were very high in Tuscarora Cr and did not meet the bacterial standards. Source of contamination believed to be from agricultural runoff and septic tank seepage.
Brunswick	(05)	yes	yes	yes	*	Little Catoctin Creek and Dutchman's Creek did not m bacterial standards based on limited sampling. Several oil spills to unnamed tributaries of the Potomac River have been attributed to the Brunswi B & O Railroad Yards. Urban and agricultural run and septic tank seepage are believed to be the so of bacterial contamination in the segment.
Pleasant Valley	(06)	yes	yes	yes	no	Israel Creek did not meet bacterial standards, becau of agricultral runoff and septic tank seepage.

NONPOINT SOURCES IN THE MIDDLE POTOMAC RIVER AREA

BASIN NEEDING EVALUATION (Basin Segment Code)	DRAINAGE AREA (SQ. Miles)	PRINCIPAL TYPE OF NONPOINT SOURCE PROBLEM
02-14-03-01	3.6	agriculture, soil erosion
02-14-03-02	741.9	urban and agricultural runoff, septic tanks, erosi
02-14-03-03	132.8	urban and agricultural runoff
02-14-03-04	30.8	agriculture, septic tank failure
02-14-03-05	13.6	urban runoff, Oil seepage from r.r. yard
02-14-03-06	14.1	agricultural runoff, septic tank failure

LOWER POTOMAC SUB-BASIN

SUMMARY OF WATER QUALITY

SEGMENT	NO.	MEETS WATER QUALITY STANDARDS				COMMENTS[2]
		D.O.	Temp.	pH	Bacteria[1]	
Main Stem	(02)	yes	yes	yes	*	St. Catherine Sound closed to shellfish harvesting. Occasional oil spills from Stewart Petroleum at Piney Point. High nutrients and algae population in upper reaches.
St Mary's River	(03)	yes	yes	yes	*	Tidal area upstream of Church Point closed to shellf harvesting.
St. George's Creek	(04)	yes	yes	yes	*	Schoolhouse Branch and Locast Grove Cove closed to s fish harvesting.
Breton Bay	(05)	yes	yes	yes	*	Tidal area upstream of Chevy Cove closed to shellfis harvesting.
St. Clement Bay	(06)	yes	yes	yes	*	Canoe Neck Creek, St Patrick Creek and tidal area stream of Miley Creek closed to shellfish harvest Bacterial values exceed standard values in nontid water upstream of U. S. G. S. gage.
Wicomico River	(07)	yes	yes	yes	*	Chaptico Bay, Charleston Creek, Dolly Boarmans Creek and tidal area upstream of Barber Point closed to shellfish harvesting. Bacterial values exceed st lard values in Chaptico Creek at U. S. G. S. gagi station.
Gilbert Swamp	(08)	yes	yes	yes	no	Bacterial [illegible]s exceed numerical standard values.
Zekiah Swamp	(09)	yes	yes	yes	no	Bacterial values exceed numerical standard values.
Port Tabasco	(10)	yes	yes	yes	*	Bacterial values exceed numerical standard values at head of tidal waters and in non-tidal waters. Ar adjacent to Chalk Point closed to water contact recreation.
Nanjemoy Creek	(11)	yes	yes	yes	*	Bacterial values exceed numerical standard in Mill R and non-tidal portion of Nanjemoy Creek.
Mattawoman Creek	(12)	*	yes	yes	*	Bacterial and D.O. values exceed numerical standards the non-tidal portion.

LOWER POTOMAC SUB-BASIN
(con't)

SUMMARY OF WATER QUALITY

SEGMENT	NO.	MEETS WATER QUALITY STANDARDS				COMMENTS[2]
		D.O.	Temp.	pH	Bacteria[1]	
Potomac River Mouth	(13)	yes	yes	yes	*	Upstream portions of Smith Creek and Jutland Creek cl to shellfishing.
Huggins Point	(14)	yes	yes	yes	*	Herring Creek closed to shellfish harvesting. Occasi oil spills from Steqart Petroleum at Piney Point.
White Neck Point	(15)	yes	yes	yes	*	White Neck Creek closed to shellfish harvesting.
Morgantown	(16)	yes	yes	yes	*	Neal Sound closed to shellfish harvesting.
Cedar Point	(17)	yes	yes	yes	yes	
Chickamuxen Creek	(18)	-	-	-	-	No data.
Potomac Heights	(19)	-	-	-	-	No data.
Virginia Area	(20)	-	-	-	-	No data. Drainage from state of Virginia.

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[1] See Chapter I--Bacteria. (305(b) Report)

[2] These are brief notations indicating significant water quality considerations. See the appropriate sub-basin Chapters for detailed descriptions. (305(b) Report)

*Notation where neither "yes" or "no" adequately describes segment water quality. See comments or sub-basin Chapters for additional detail.

APPENDIX B

MEMORANDUM OF UNDERSTANDING

To implement the provisions of the Abandoned Mine Drainage Control Act of 1970, the Secretaries of the Department of General Services and the Department of Natural Resources agree to general guidelines and procedures as set forth below:

The Secretary of Natural Resources will be responsible for the program determinations as set forth and required by the Abandoned Mine Drainage Control Act of 1970. These determinations include the river basins or other general areas within which corrective measures will be taken and the schedule for undertaking the regional actions. For each area selected, the Secretary of Natural Resources shall conduct surveys and investigations leading to the determinations of what land is to be acquired, when it is to be acquired, what control measures are to be instituted, what type of engineering works are to be constructed (including among other things, backfilling of mine pits, sealing of openings, and alteration of drainage patterns) and when these works are to be undertaken.

In general, the Secretary of Natural Resources will determine what, where, and when land should be acquired or works should be constructed. This information will be set forth in a report and submitted to the Secretary of the Department of General Services along with a request for the Secretary of General Services to undertake the acquisition and construction set forth in the plan. The Secretary of Natural Resources shall inform the Secretary of the Department of General Services of any special situations or other conditions that should apply to the construction or acquisition activities and render advice and assistance to the Secretary of the Department of General Services as required.

The Secretary of the Department of Natural Resources will seek financial and technical assistance for planning, land acquisition, and restoration purposes; he will work closely with federal and State agencies authorized to administer financial and technical assistance programs in order to secure such assistance as may be available for this program.

NONPOINT SOURCES IN THE LOWER POTOMAC AREA

BASIN NEEDING EVALUATION (Basin Segment Code)	DRAINAGE AREA (SQ. Miles)	PRINCIPAL TYPE OF NONPOINT SOURCE PROBLEM
02-14-01-02	3824.4 (Md. total) 14670 (total)	urban runoff (D.C.), agriculture
02-14-01-06	42.4	agricultural
02-14-01-07	53.5	agricultural
02-14-01-08	44.7	agricultural
02-14-01-09	112.5	agricultural
02-14-01-10	43.5	agricultural
02-14-01-11	72.2	agricultural
02-14-01-12	78.8	agricultural, urban
02-14-01-14	21.0	agricultural
02-14-01-15	6.6	agricultural

Commensurate with his powers and duties as set forth in Article 78A of the Maryland Code, the Secretary of the Department of General Services shall cause the land to be acquired and the construction to be performed as set out in the plan and communications received from the Secretary of Natural Resources. Matters pertaining to the acquisition of land and questions relating to how and by whom construction shall be accomplished, will be resolved by the Secretary of the Department of General Services. He shall be responsible for engineering plans and specifications, letting of contracts, supervision of construction, and payments relating thereto. In these matters, the Secretary of Natural Resources will provide all possible assistance as requested by the Secretary of the Department of General Services.

The two departments will work in close cooperation and through appropriate liaison, keep each other informed as studies or works progress. In its initial studies and surveys, the Department of Natural Resources will be sensitive to the duties and responsibilities of the Department of General Services and will actively avoid any train of events which will materially restrict the choices or decisions within the jurisdiction of the Department of General Services.

Expenditures from the Mine Reclamation and Water Quality Restoration Loan authorized by the Act of 1970 will be made upon approval of the Board of Public Works only.

J. Millard Tawes, Secretary
Department of Natural Resources

George R. Lewis, Secretary
Department of General Services

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